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STRAIGHTENING TEETH*

BERNHARD WOLF WEINBERGER, D.D.S., NEW YORK, N. Y.

THERE assembled in the city of Washington, during the month of September, 1887, and as a part of the Ninth International Medical Congress, a group of men then in the prime of their professional career. This section, under the chairmanship of Jonathan Taft, was there to discuss the various problems of dentistry. Among the many papers presented were some ten in number relating to correcting "irregularities of the teeth." Besides the older men, such as Doctors E. Parmly, William Allport, A. L. Northrup, L .D. Shepard, C. F. Boedecker and others, there were present and took part in the meeting Doctors E. H. Angle, Calvin S. Case, Victor Hugo Jackson, J. N. Farrar, E. S. Talbot, C. I. Goddard, and S. H. Guilford, all young men just entering the profession and destined to play a most important part in the furtherance of our particular field of dentistry.

I believe it can safely be said that at that session these men met for the first time, to begin their intense rivalry. Even at that meeting, if one would read the transactions, he would find that the battle was well under way, and continued until each had passed on to the Great Beyond.

Only those who knew these men personally, and it was my good fortune to have had this pleasure, and who were in practice during the period of this bitterness, can appreciate what these men did to elevate our branch of the dental profession.

For a pen picture of these men, I refer you to the article by Frank M. Casto, read before the American Society of Orthodontists in 1930, which is to be found in the transactions of that Society.

*Read before the New York Society of Orthodontists, New York, N. Y., Nov. 14, 1934.

I wish that I had the time to include this story so as to have the proper background for this paper and also that I might briefly review the activities of each of these men, for they all played a most important part in bringing orthodontia to the height it reached in 1915. They were the incentive for others to study, to reflect, and to work.

These men were the most prominent in orthodontia and were in possession of the best knowledge of the day, and therefore exerted a strong influence in establishing the trend of treatment. While they often disagreed with respect to various methods, and frequently assumed an uncompromising attitude toward the use of certain types of appliance, they were always striving to improve conditions by advancing the profession of the then so-called "orthodontia."

It is unfortunate that they permitted their personal feelings to interfere with their ideas, for had they been able to work in greater harmony, orthodontia would have been the gainer. No one can tell just how far it might have progressed. Fortunately those in this field today do not have to contend with this bitterness, strife, and unpleasantness. Perhaps on account of this, working in greater harmony but lacking their aggressiveness, we might attribute, in part, the gradual backward sliding of orthodontia.

I do desire to dwell, however, upon the activity of one of these men, to cite his efforts and great influence upon others, for it was Dr. Edward H. Angle who brought harmony out of chaos and changed the idea from "straightening teeth" or "correcting irregularities of the teeth" to that which we knew a decade and a half ago as orthodontia. I say this, for the present-day practice of orthodontia has again turned to what it was thirty years ago.

Dr. Angle must be given credit for possessing an uncanny ability to select and coordinate those things which were of value in the practice of orthodontics. His work became recognized as having unusual merit. His conception and application of occlusion, his uncompromising attitude toward the extraction of teeth, his high ideals, fine technical skill, courage of conviction, inflexible personality, and lofty aims stamped him as the powerful figure in the realm of orthodontia.

ORTHODONTIA'S REMARKABLE RISE FROM 1900 TO 1915

To Dr. Edward H. Angle, orthodontia owes that renewed impetus which this great thinker instilled into our science. Probably no other one man in dentistry did more to foster this branch of dental science as a specialty, causing its separation from the general practice and advocating it as a recognized and distinct science. He said, "In 1896 I advocated its teaching and practice as a specialty. . . ."

"This is abundantly proved," said he, "by the fact that although orthodontia has been a part of the curriculum of all dental colleges from Harris' (1839) time down, not one dental student in all that time has gained sufficient knowledge of the subject in the dental college to enable him to practice it with sufficient success to make it his sole means of gaining a livelihood, in spite of the immense number of these deformities in every community. Having become entirely discouraged with my experiences in dental colleges, I became filled with

the belief that if orthodontia was to make any material progress, a separate school, entirely independent of dental schools, must be formed, which would amply provide opportunity for those with aptitude and liking for the subject to study in a broad, thorough and comprehensive manner, and where it would be relieved from all blighting, handicapping influences which are necessarily thrown around it in dental colleges.'' Hence was founded the Angle School of Orthodontia, in the summer of 1900.

The establishing of the Angle School laid the foundation of orthodontia as a specialty, and in order to fulfill the requirements, he helped organize in 1901 the American Society of Orthodontists, and was instrumental in founding the publication of an independent journal, *The American Orthodontist*, in 1907. We thus find, as in the case of Chapin A. Harris, in 1839-1840, that Angle did for orthodontia what Harris did for dentistry.

In 1902 Angle strongly advocated the separation of orthodontia from the general dental profession, making it a distinct specialty and thus fulfilling Farrar's prophecy. For some years previous he devoted his practice exclusively to orthodontia, and by the training of the men received in his school, this branch then became a distinct specialty of its own.

The Angle School of Orthodontia was such a radical departure from the prevailing ideas of those who contented themselves with attempted corrections of ''irregular teeth,'' that it is easy to understand that this conception met with an almost organized antagonism. But out of this school came the incentive for a better knowledge and understanding of this new department.

Fortunately all postgraduate teaching and courses in orthodontia have been encouraged by the men in the profession. The dental manufacturers and dental colleges were not interested in this phase, and for that reason it thus achieved its remarkable scientific advancement.

Just how was this remarkable change from ''straightening teeth'' to the science of orthodontia brought about? We hear so much about private schools and their evil influences, but if conducted along the lines of proper ideas and ideals and headed by one, sincere and honest, there could be no objection raised to such teachings. Dr. Angle's school was never a one man's institution, but consisted of a faculty of experienced and trained men, each thoroughly acquainted with his particular subject. The courses were no ''cinch'' ones, as those who took them soon realized. To begin with, as Dr. Angle often related, he had as many as 400 applicants for a single course, these he sifted down to less than a hundred. Those fortunate to be considered were put through a thorough preliminary examination to determine their background and knowledge, and not more than about twenty-five were finally selected to take the session. This did not mean that they were through, for many a man was cast by the wayside without receiving a diploma. Contrast this with the other orthodontic schools, their methods and objects, and one can easily understand why our specialty has fallen.

Frank M. Casto, before the American Society of Orthodontists in 1930, while considering ''The Trend of Orthodontic Treatment,'' writes as follows:

''The opening of the Angle School in St. Louis in 1900 for teaching orthodontia marked a most important epoch in our history. Very shortly law and

order was to supplant chaos. A vast number of conflicting ideas were co-gathered and calssified, and fundamental principles were promulgated. In fact, orthodontia was reborn. During this transitional period there came into being, what some were pleased to term, the new school of orthodontia. While I do not believe that this was to include only those within a certain group, such was the interpretation generally made. At any rate under this influence, orthodontia progressed rapidly and soon established itself as a distinct specialty. Now conditions inspired men to enter the field of orthodontia. Its potential possibilities were becoming recognized. The biologic problems were being seriously considered. Occlusion and the Angle classification upon which it is based were receiving careful study, and their value in treatment was fast becoming realized. The further development of standardized appliances was given much attention. Orthodontia took a more prominent place in the curricula of many schools of dentistry, and its teaching showed marked improvement. Old policies of secretiveness became obsolete. Men from the Angle School, recruited here and there by others of the same belief, went out over the country and spread the gospel of the new truths and their application to orthodontic treatment. In fact, at the end of the first decade of the twentieth century, orthodontia was riding the crest of a tidal wave which was sweeping over the country, and the trend of treatment which followed in its wake was based upon accurate knowledge rather than upon superficial opinion snatched from a preconceived interpretation. And so, fact finders in orthodontia were organizing for new aggressiveness.

"The trend of treatment was fairly well established and was based primarily upon securing correct occlusal relationships. The natural and mechanical forces of occlusion were better recognized, appliances were refined and their application and use more intelligently understood. Cause and effect were delineated, diagnosis assumed larger proportions and was made, in actuality, upon the basis of knowledge acquired through study, observation and experience, and included within its scope a consideration of the biologic problems concerned in treatment. The renaissance was at hand, and orthodontia was being propelled forward by the justice of its cause and the necessity for its practice. The leaders of this crusade had accomplished a most remarkable work, but like the leaders in other branches of medicine and dentistry their ideals were destined to receive a severe shock.

"Through the concerted and enthusiastic efforts of the orthodontists, by personal contact with the dentists, by appearing before dental organizations, and by the publication of numerous articles in the journals, the value and importance of orthodontic treatment soon became recognized by the members of the dental profession, many of whom were quick to realize the opportunity offered in this field. The laity also became rapidly enlightened and were demanding service for their children. The supply houses and laboratories started an extensive advertising campaign. Standard sets of appliances to meet the requirements of every case were offered to the profession. Laboratories advertised that appliances suitable for use in the treatment of any case would be designed and constructed, either of the fixed or removable type, upon models sent to them by

the dentists, at a comparatively small cost. The financial reward appeared attractive, the field fertile, and according to the advertisements the operations were easy. Commercialism had crept in and the scenes began to shift rapidly. A large number of men were attracted by these propositions either to enter the field of practice exclusively, or to devote a small part of their time to this branch of the work. Some were qualified, some moderately so, and some were not qualified at all. Competition came into the picture, and there began a practice among a considerable number which largely ignored the results obtained in treatment. Frequently teeth were injudiciously extracted to simplify the work. The unscrupulous offered large commissions for the reference of patients. Diagnosis was given but little consideration. Appliances were selected with poor judgment, crudely constructed, and unskillfully placed. All available cases were put under immediate treatment. Fundamental principles were disregarded and the science of orthodontia was being prostituted. The trend of treatment was running its course with an incompatible mixture of good and bad, endlessly provoked by indirection and indiscretion.''

In reviewing the situation during this period from a purely orthodontic viewpoint, we find a general change from the idea of just moving the teeth into alignment with mechanical devices, toward the biologic side. That the importance of this aspect was taking a greater hold by all of the leading men can be seen if the literature is reviewed. Here again is one of the greatest contributions of orthodontia to dentistry, for as a result of this new approach, dentistry as a whole has materially progressed.

RETROGRESSION. 1915

We are bound by tradition and by the needs of the day to do all in our power to advance the art, the science, and the practice of orthodontia, not only for our own good, but chiefly for the protection of the public. What then are some of the problems that have caused the standards of orthodontic practice to change from about 1915 to this date?

The graduated and trained orthodontic specialist who was fortunate to have entered its practice twenty or more years ago, he who took an active part in its evolutionary development and has witnessed the introduction, through orthodontia, of the many ideas that since have become a vital part of dentistry, cannot help but view the present situation with considerable alarm.

Progress in the science of orthodontia has continued and will continue unabated. There has probably been more advancement made in this period than in any like period of its history. The reason for this is due to the many earnest workers in orthodontia who have sacrificed their leisure hours and nights to advance their specialty. I wish I had the time to record their names.

The earnestness and the sincerity of their labors, to learn and bring to light such factors as would help advance our profession, have reacted so favorably that men with scientific training and knowledge in correlated sciences gladly cooperated with them whenever and wherever approached.

Our knowledge in physical anthropology has advanced due to the efforts of such men as Gregory, Osburn, Hrdlicka, Boas, Brash, Keith and many more of

their coworkers, as a result of the interest in this phase of Hellman, Noyes and others in our own specialty.

We have a better conception of the influence of the endocrine glands and the part they play in the development of the teeth and their effects on the jaws, resulting from the cooperation of such men as Jansen, Timme, and Sajous.

The problems of nutrition and its importance to deformities and decay have received the consideration of such men as McCollum, Parks, Shipley, Hess, and many others. Thus the continual advancement along biologic lines, as well as many other scientific studies, first given consideration in orthodontia, has become an important factor and now receives proper consideration in dentistry.

How then does orthodontia today differ from that of twenty or more years ago? Mainly in its wider scope. The intensive study of the early graduates of the Angle School of Orthodontia helped to introduce physical anthropology, biology, embryology, endocrinology, pediatrics, physical diagnosis, psychology, nutrition, and comparative anatomy into orthodontia. Their work brought an entirely new concept of the subject.

Besides the subjects just mentioned, of which the orthodontist should have a thorough working knowledge, he must undertake a greater study of art, anatomy (both human and comparative), bacteriology, chemistry, embryology, histology, metallurgy, physiology, pathology, roentgenology, and surgery. In addition to these he must be able to make practical application of technical knowledge and possess a dexterity of fingers.

The specialist today must be first a student and then a technician—quite the reverse of the average dentist. Yet the two must be well balanced. The field of orthodontia has assumed such tremendous proportions that it is difficult for even the trained specialist to grasp the entire subject. How then can the average dentist hope to keep up with it?

Specialists in the practical arts and research workers are needed, and we must seek to develop once more the man who will have a sufficient understanding of orthodontia and other specialties in dentistry including the many biological sciences, and who will be able to appreciate the special problems engaging the attention of the various specialties. The detailed and practical work of the various specialties requires special skill and training, such as no one man could hope to acquire.

Would that I could rest here, but there are many disturbing features that are at present far overshadowing this important phase and that are gradually dragging orthodontia back to where it was thirty years ago.

One of the most important reasons for this decline is its present educational status. The special private courses are far below the standards set by Dr. Angle, for they lack not only the "ideals" he so instilled in his early pupils, but likewise the fundamentals of orthodontia. The postgraduate courses attached to the dental school fail, in most cases, to meet the present requirements, while the dental schools are still floundering along, trying to determine just what to teach the undergraduate student.

Dr. Noyes has so beautifully expressed the fundamental difference between dentistry and orthodontia and why dentistry has failed to make orthodontists, that I should like to include some of his observations in this presentation. He states: "Is orthodontia a specialty or is it just a part of dentistry? What is its relation to dentistry and medicine? In theory, in observation and in personal experience, I am forced to regard orthodontia as a specialty which bears a similar if not identical relation to dentistry that dentistry bears to medicine, if dentistry is properly considered. Theoretically, orthodontia is based upon entirely different fundamental sciences than dentistry. Malocclusion is not a disease; it is seldom associated with pathologic processes; it is a defect in development.

"Dentistry is concerned with the diseases of the human mouth, their prevention, their cure, their consequences, and the restoration of the damage caused by them. It is evident that orthodontia and dentistry are based on different fundamental sciences. Orthodontia is related to dentistry only in that it originated in dentistry. Orthodontia is certainly more closely related to orthopedic surgery than it is to operative dentistry or, I believe, any other field of dentistry.

"All dental procedures are compromises. I believe no one would attempt to say that a tooth with a large gold filling in it is better than it was before a cavity appeared, or that a root carrying a crown is better than it would be if the natural crown could be replaced, but you are faced with the effects of a disease and you have to make a compromise operation which will restore the conditions to as nearly normal as possible.

"That is the rock which has wrecked the teaching of orthodontia in dental schools. When you attempt to restore a biological mechanism, you must at least aim at perfection. You must at least visualize the perfection in that development, and you must strive without ceasing to accomplish that idea of biological development which has no compromise. Therefore I say that the fundamental philosophy of orthodontia and that of dentistry are different.

"In 1910 orthodontia appealed to dentistry to recognize it as an entity, related to dentistry and related to medicine, and dentistry refused. Dentistry said, 'Orthodontia is dentistry; it has always been done by dentists, and it is going to be done by dentists, and we are going to teach it from the dental standpoint.' The standard of orthodontic practice has degenerated from that date to this.

"Why has dentistry failed to make orthodontists? Dentistry has failed, in my opinion, to make orthodontists, first, for the reason I have already pointed out, that its fundamental philosophy is different. Second, it has failed because it has all of the time been, and still is, teaching not orthodontia but 'regulating teeth.' It has failed to follow either the development of the technic of orthodontia or the development of orthodontic reasoning. It is still teaching orthodontia to dental students as the moving of teeth into line, without any reference to their relationship to each other, using appliances which in many instances

could never produce the tooth movements which are necessary. The student is given the idea that when he graduates he is a master of orthodontia as well as of every other specialty of dentistry.

"Dentistry has failed to produce orthodontists because it has failed to recognize the facts that in thirty-odd years orthodontia has developed a technic of its own which is unknown in dentistry or in any other phase of human endeavor, and this technic is scarcely related to dental technic. This does not mean that there are not applications of dental technic in orthodontia, but orthodontic technic has developed independently and outside of the college of dentistry.

"I pointed out many years ago that even in soldering, dental soldering and orthodontic soldering are fundamentally different. In dental soldering the maximum of solder and the minimum of plate are used. Orthodontic soldering is based upon the principle of uniting two pieces of metal with the minimum of solder. Where will you find that principle in dental technic?

"Orthodontic technic is based upon acquiring the skill to solder things with the free hand, which are in perfect relation to an ideal, a skill which can be acquired. Dental technic depends upon placing the pieces in solid investments and holding them in relation by cumbersome arrangements while they are united, with a maximum of solder and a minimum of plate. You can scarcely find a point in which dental technic and orthodontic technic come together. Even in the technic of taking impressions of the mouth, orthodontia had to develop a procedure of its own, and now it is used in no place in dentistry; only in orthodontia."

When we take into account that about 70 per cent of the dentists are everywhere again undertaking orthodontic cases or refer cases to another dentist, a so-called specialist in every department of dentistry, and that the majority who are now "specializing" come directly from the dental schools, we cannot but feel we are again just where we were thirty-odd years ago. Most of these men are today merely "straightening teeth" and the mechanical factor has again assumed its former significance. Contrast this with the ideals of the orthodontist who recognizes as fundamentals the problems of development and growth, and the intricate physiologic mechanism concerned in this process, who understands the difference between the physiologic and the chronologic age, who considers the biologic problems along with the mechanical, who refuses to consider every orthodontic case as a potential "fee" and places appliances upon every patient at any age, who has the courage of his convictions in giving advice and keeping these patients, where there is a question as to immediate treatment, under observation.

Meanwhile the problems in our specialty have become more numerous and complex; more experience, backed by sound judgment, is required, and greater responsibilities are placed upon our shoulders. Far more exact technic, requiring a greater skill and care in constructing and adjusting appliances, is essential than ever before.

Here we have the contrast that exists today in orthodontic procedure. There is little wonder that the laity little heeds the recommendations of a dentist but attempts to use its own judgment in seeking advice and service.

Those of us who have watched this retrogression recognize that this inexperience, incompetency, unscrupulousness, combined with fee splitting and commercialism, are what have caused the word "specialist" to be degraded. Unethical orthodontic and dental practices have a most baneful influence on the development of the young practitioner. In the early days of this century it was the ambition of the young orthodontist to advance by dint of hard work, close attention to the problems, to his patients, and by keeping himself thoroughly up to date with every advancement in the science and art of practice. It is painful to admit that at the present time advancement is not always secured in this way, but by alliance with a group of men who think less of the individual's merit and more of his financial prospects.

It is difficult to comprehend the recent backward trend of some men in advising their professional brethren to undertake everything that presents itself in their office, whether they be qualified to handle the task successfully or not. Personally, I wonder whether the dental profession is wise in *again* trying to adopt this policy, and whether it is giving due consideration to the public's welfare or more to its own.

We all admit that the practice of dentistry today is vastly different from that of yesterday. If it has changed, have not also some of its specialties?

Yet these same men look upon the science of orthodontia in the same light as of thirty years ago. They still retain the same attitude as they did in their student days. The colleges themselves, so far, have not been able to solve its proper teaching; though nearly all agree it should be confined to postgraduate instructions, giving just sufficient so that the student can recognize some of its problems, classification, and the general method of treatment. Those in the specialty and colleges recognize how meager is this training and how dangerous it is to the public at large.

The dental profession, unfortunately, still considers orthodontia to be merely a problem of moving teeth, anywhere and everywhere, and are not concerned with those problems that are of a more vital importance.

It was very common years ago to hear many state: "I do not care to do orthodontia, not only that I prefer not to work on children, but that it demands so much of my time, and requires such special skill, where the possibilities of failure are so great, that I cannot attempt to deal with this problem adequately." These men were honest in their convictions, and as a result those that took a liking to the work and cared sufficiently for children, undertook to specialize. They began to study and to think along entirely different lines and ideas. As a result we have, today, one branch of dentistry that might be called a science of its own.

I have preserved a letter that appeared in one of the New York papers of Jan. 2, 1913, signed "A Practitioner." This clearly conveys the general idea of what then was thought to be orthodontia. It reads as follows:

"To the Editor of The New York Times:

"I have read your editorial note on the reported advance in dentistry of children with malformed teeth. Orthodontia, or 'tooth-straightening,' is a

brutal commercialism. Specialists practicing it could not exist without the rebates to their agents, without begging the professions to supply them with victims, and without offering to restore beauty in the guise of a specialty of dentistry. Though the mutilating of the young for money is done with the consent of the affectionate mothers, the wrong and inhuman intrusion upon the child's health calls for serious consideration.

"The straightener of children's teeth deals with human teeth as the cattle-fancier deals with the ears and tails of most of our domestic animals, to satisfy foolish vanity, for unsound, cruel, cosmetic reasons—and for the price!

"The speculative methods are employed at an age when teeth most readily yield to causes of decay. The formidable orthodontic muzzles cripple mastication, impair digestion, and often inflame the tender gums. He coolly and deliberately invades the child's domain with vexation, jars upon its feelings, forces tears to its eyes, and only the poor child feels 'where the shoe pinches.'

"On the other hand, it is an admitted fact that all wires, bands, screws, nuts, and bolts—whether these are made of German silver or gold—while in the mouth, in presence of saliva and body-heat, disintegrate, produce an electric current, and the poisonous salts thus formed are assimilated by the child with woeful results.

"These truths could hardly be told to the patients!

"Would that the orthodontists could destroy the ugly mouth-breathing which produces malposition of teeth. Until then the regulation of crooked teeth will never cure obstructed nasal breathing and acquired habits of mouth-breathing, nor restore normal breathing."

Are we again heading toward this same idea of "tooth straightening" and must the specialty revert back some twenty or more years? I pray not. Yet one only has to turn to the October *Dental Cosmos* for the answer: "What Price Orthodontia" and then on page 1124:

> "To advance the science and art of orthodontia in all its phases.
>
> "To discourage the divorcement of the art and science of orthodontia from the profession of dentistry.
>
> "To encourage the contribution of the science and art of orthodontia in the interest of public health.
>
> "To cooperate with dental organizations, societies and associations by lectures and meetings for the purpose of enhancing the progress of the science and art of orthodontia."

Is there any wonder that today, so-called "orthodontia" is considered a "racket" and is so looked upon by the profession and the laity?

It is not entirely the fault of the dentists that there has recently been brought about a lowered standard and respect for orthodontia. It is more the fault of the incompetent specialist in our midst.

I might give many examples to prove this statement, but I believe one will suffice. A member of this Society as well as of the American Society of Orthodontists, who has been in practice for many years, has in one case for six years

kept appliances upon the maxillary teeth without ever removing them, thus resulting in the decay of almost every tooth. During that time no appliance was placed upon the mandibular teeth, and, as a result, with the exception of occlusal fillings in the molars, the teeth are in excellent condition. The mandibular teeth are badly crowded and overlapping, and yet no attempt has been made to correct this condition. Upon the insistence of the patient's parents that the mandibular teeth be taken care of, this specialist placed metal ligatures between the second premolars and the second molars and permitted them to remain there for a period of over a year without making bands. On the left side these metal ligatures worked their way into the gum and resulted in an infection. The first molar consequently had to be extracted. Is this practicing orthodontia?

It is time for this and other societies to begin to clean house, to see that those not properly qualified or interested in the welfare of the patient be driven from our midst.

Why is it that so many men fear the American Board of Orthodontia or refuse to qualify? Is it improperly constituted or handled, or are our members so superiorly constituted that they feel they know more and are better qualified than those elected to the Board? This Society, I believe, contemplates becoming a branch of the American Society of Orthodontists and yet the vast majority of men will not lend themselves to protect the public's interest. A few feel that there should be state supervision and a board created by the educational authorities of this state; if that is more advisable, then try to bring it about. One thing is certain, that unless we ourselves begin to clean up, some one else will, and then it will be too late.

Another thing this Society can do to help matters is to investigate thoroughly the fee problem. Can orthodontia as it was known some years ago be done with fairness to the patient and to the operator for $7 in a clinic and $10 in the specialist's office, or even at $15 a month, or is it just "straightening teeth" at that price? If it be the latter, let us tag it as such and educate the public that there is a vast difference between orthodontia as it should be practiced and just moving irregularly placed teeth.

DISCUSSION

Dr. Harry E. Kelsey, Baltimore.—The picture which Dr. Weinberger has given us of the present status of orthodontics is perhaps not overdrawn. Nevertheless the situation partakes so much of the nature of previous epochs in the history of the professions from which we have emerged with new ideals and higher standards and accomplishments, that I do not think it is by any means hopeless. It is an impressive list of names which he gives of those contributors to the meeting in Washington, back in the 80's. All those men had vision, and believed whole heartedly that in the field of orthodontics lay the promise of a creditable career and the possibility of performing a greater service for humanity than they had hitherto been able to do, and they were possessed of the dauntless spirit which generally realizes its object. It must have been one of the earliest movements in the dental profession looking toward prevention of dental ills, rather than repairing the results of ills which already exist, for the writings of these men show that they, even then, realized that the results of successful orthodontic treatment rendered the mouth far more normal, thereby establishing a much more nearly normal resistance to the invasion of caries and the other ills to which the teeth and mouth are subject. It was almost inevitable that these men should clash, for there was

not the close association at that time which gradually grew up at a later period, and there was such a universal lack of appreciation in the profession as a whole for the high standards which these men demanded in orthodontics that each one probably felt that the others were more or less infected with the same attitude. This was natural because they felt that they were invading a new field; and there being as yet no standardization of methods, it was only to be expected that they would pursue somewhat different paths to the same end. Naturally each thought he was right, and if so, the others must be wrong. They had strong convictions and the fighting spirit, and it is probable, as intimated by the essayist, that this was responsible for some of the progress in the profession at that time. They were intolerant because they believed that they, and only they, were right, which is characteristic of all new fields of thought and endeavor. I also had the good fortune to know most of those men, and I count this as one of the most gratifying of my professional memories. Dr. Weinberger has traced in a very interesting manner, and with much fidelity to the correct history of the period, the development of the modern specialty of orthodontics. He takes a rather gloomy view of the present status of the specialty; but undoubtedly there is a vast army of commercially minded men who have taken up orthodontics solely for what they could see in it in the way of financial reward without recognizing at the same time their deep responsibility to their patients. I cannot, however, agree with him that there has been a great degeneration in the standards of those conscientious men who practice it as a specialty after due preparation. I believe there are still hundreds of men in this country and abroad who have by earnest endeavor prepared themselves for the practice of orthodontics who render this service to their patrons with the same fidelity which characterized their efforts a decade or two ago, and I believe they are constantly recruiting younger men who are earnest, and willing to work and, what is just as important, to study. On the other hand, I agree fully with him that there may be many men who have gone into it with the idea that it was an easy way to make a living, an easier way than they had been pursuing in general dental practice. They are, of course, deluded, and their patients suffer along with the good name of the specialty which they have so lightly adopted. This situation is, however, not unusual in its application to orthodontics. A similar condition existed at the dawn of the dental profession. Quite recently I read in *A History of Orthodontics,* the author of which is our present essayist, of the strenuous efforts which Fauchard made more than a hundred years ago to have the practice of dentistry regulated so that those entering its ranks should have qualifications which had been proved by adequate tests as to their fitness. Again in this country, the history of the dental profession is replete with instances of its abuse, and the imposition on the public of a host of self-constituted practitioners. Dentistry fell into disrepute at the time, but those men who were conscientious and qualified carried on, and their work was eventually recognized and appreciated; but it was not without strenuous efforts on the part of this better class of dentists that the profession was saved. To trace the analogy further between that period and the present time, I may say that conditions as they exist today will again necessarily find their improvement through the conscientious and faithful adherence to the high standards which have been set by those men who are truly qualified.

The American Board of Orthodontia will prove, I believe, to be one of the agencies for bringing this about, and I feel like paying tribute to Dr. Ketcham, who worked so long and tirelessly to effect its organization. But while we condemn those members of the dental profession who, through their legal right to do so, rush into the specialty of orthodontics and offer their services, without being properly prepared, and undertake the treatment of cases solely through the manipulation of appliances manufactured for them in some laboratory, which purports also to be competent to give them advice with regard to the conduct of their cases, we must also look within our own ranks to see whether we are doing all that we should do, and note whether we have justly laid ourselves open to criticism by the best elements in the profession who are pursuing general practice or have taken up some one of the other specialties. It would not be strange if this were true, since it is true in almost every other walk of life. Even at the risk of the ever ready vehement denunciation which is usually served out to those who venture even to allude to this field of orthodontic procedure, I

nevertheless wish to bring to your attention the attitude of quite a large percentage of the members of the orthodontic specialty toward the subject of extraction as an orthodontic procedure.

The standpatter still exists, the man who believes that under no circumstances whatever is the extraction of a tooth as an orthodontic procedure justifiable. These are the men who have carried over from a decade or two decades ago, when at the introduction of intermaxillary force it became an axiom in orthodontics that extraction was no longer necessary under any circumstances. We all believed it, and with righteous indignation we attacked any one who advocated it, or even admitted that extraction was ever indicated. This attitude was fully justified as long as orthodontists believe that by means of intermaxillary force and other advanced orthodontic technic they could restore to normal every case which came into their hands, whether it was merely by providing sufficient space in Class I cases, for all of the thirty-two teeth in perfect alignment and normal relationship, or whether it involved the restoration of normal mesiodistal relations between the arches in Class II or Class III. Therefore orthodontists, as a rule, yielded to the conviction, because a large number of cases (which had until then usually proved failures) were now successfully treated by the newer technic. It was a self-evident fact that all cases might be so treated with success, except those in which the patient failed to give due cooperation or the operator himself had exhibited some incapacity in a specific case which he had been able to avoid in others which appeared to be just like it. Years ago, Lundström called attention to the fact that the maxillary bones of the civilized human being did not always provide sufficient space for all the thirty-two teeth in even alignment, and I believe that all orthodontists have found cases in which they have been forced to resort to a compromise treatment, or permit them to be recorded as failures. But they have been rather ashamed of it, and have not, as a rule, been willing to report their experience. For a long time, studious and conscientious men in general practice and students of the collateral sciences have recognized that the development of the civilized maxillary bones was not always sufficient to accommodate thirty-two teeth, and it is my opinion that we have laid ourselves open to criticism, for not ourselves, as a body, giving this fact recognition and pointing out the conditions under which extraction becomes necessary. Because we have ignored it, it has been said in some quarters that we have been afraid of "killing the goose that laid the golden egg," that we were not so much interested in the patient's welfare as we were in long and remunerative treatment. It cannot be denied that there are many patients with relapses walking about the streets today, which, after a thorough, conscientious, experimental treatment along ideal lines, should have been given the benefit of a compromise treatment.

I am quite aware that orthodontists have been reluctant to treat freely and openly the subject of extraction for fear the general practitioner and the "specialist in everything" would accept it as his authority for a campaign of arch mutilation combined with half-baked orthodontic procedures or with none at all. But I contend that he will do this anyway, and that the orthodontists, instead of ignoring the subject publicly, should, as nearly as possible, specify those conditions in which extraction becomes a justifiable orthodontic procedure. But I wish to state here, just as emphatically as I did in a paper read before one of the general sessions of the American Dental Association in Chicago, more than a year ago, that neither the general practitioner nor even the inexperienced specialist is justified in making an extraction as an orthodontic measure without first securing the opinion of one who is qualified by training and experience to advise him.

There are other points brought out in the excellent paper of the essayist which are deserving of comment, but I feel that they will be treated by others who will undoubtedly wish to discuss the paper.

In closing I may say that I am usually regarded as an incurable optimist. I admit it, and I expect to remain so as long as men like Dr. Weinberger and a host of others I could mention, continue to devote so much of their time and strength to the further development of the specialty for which we all have so great a regard.

Dr. Milo Hellman.—I just wish to make a few statements, a few remarks, on Dr. Weinberger's paper. Instead of using the word "degeneration," I think I should substitute for it

the word "confusion." I think the trouble now is that we are more confused than ever before, or at least up to 1915 we had few means to reach one aim, and it was pretty straight thinking. Now we have no aim and many means to reach it. The present situation of confusion must not, however, be taken separately. We are living in a world of confusion. Ideal plans are devised now even by the government, but when it comes to carrying them out we are dependent on human nature, and human nature diverts us from our straight thinking, so what we get is confusion. For instance, it is very fashionable now to default. Even nations are beginning to default. The early orthodontists never knew that word "default." When they had a relapse, they went at it again; and when it relapsed again, they went at it some more, and so they kept on going dauntlessly ahead unmindful of any failure for they did not think of defaulting.

Now my plea would be that we should relieve ourselves of the general pressure of confusion and the tendency to default. Orthodontists of today have a better fundamental knowledge, I believe, and more means to reach a definite aim. Therefore, I hope that no one will think of defaulting in that definite aim.

Dr. S. Lewis Kregerman.—Dr. Hellman's discussion reminded me of a story, because I am more or less in harmony with his thinking in disagreeing that we were further advanced in the science of orthodontics in 1915 than we are today.

In those days the definition of a specialist was one who knew more and more about less and less, but I think today orthodontia has really progressed into so many ramifications that a true definition of an orthodontic specialist is one who knows less and less about more and more.

Dr. Frederick C. Kemple.—I want to state frankly that I was disappointed in the tone of Dr. Weinberger's paper. I am right in a class with Dr. Kelsey when it comes to being an optimist. I do not think orthodontia has ever been in the position for real progress and advancement as a science that it occupies today. He spoke about the ideals that were set up for us a few years ago. It is all very well to have ideals, but it is pretty distressing and disturbing to try to live up to a lot of false ideals, as were many of those ideals that were held up to us then. Today we are seeing orthodontia as practically the same as orthopedic surgery. We are going to do the best we can with the material we have to work on.

Speaking about extraction and so forth, I can very well remember a few years ago when we were studying art in connection with orthodontia, a very well-known artist was called in to comment on the facial results that had come about through orthodontic treatment, and in many of these results the artist's comment was that the features had been spoiled rather than improved. We were trying to live up to false ideals. I guess we thought we were Pygmalions working on as sculptors; but we were not. I cannot believe at all that orthodontia is in the position today that it was thirty years ago, or even fifteen years ago. I think we are far ahead of that, and I cannot believe either that there is even a great army in the profession who are so commercial that they put their own personal interests ahead of the welfare of their patients. I think on the whole the profession of dentistry is about on the same basis as that of medicine, and orthodontia is on about the same basis as that of almost any other specialty in medicine. You will find in every one of them a group of men who are spurred on by their own commercial interests. They are going to make all out of it that they can, but I believe the majority of the men who are practicing orthodontia today, not only as specialists but also the men who are in general practice and who are devoting part of their time to orthodontia, are, on the whole, a perfectly honest, conscientious group of professional men who are trying to do the best they can for their patients.

Dr. Bernhard W. Weinberger.—I am very grateful to Dr. Kelsey, Dr. Kemple, and Dr. Hellman for bringing out the points they did. I am sorry I created the idea of being a pessimist because that was not the point at all. You can prepare a paper and keep to the middle road, or take the other extreme with the hope that through a discussion points will be brought out that will be of value.

The point that I tried to emphasize is that at the present time, today, there are a group of men who are doing orthodontia as we know it, but there are a large group who are still

doing the straightening of teeth as they were years ago. Now the sooner we, as specialists, and as a Society, recognize that point and begin to educate the dental profession and the men within our own ranks that there is a difference between those two things, the better it will be for all of us. There are more men in orthodontia today who are doing better thinking and better work than there ever were. It was not that group that I had reference to at all when I spoke of "tooth straighteners." There is that other large group who have the ideas we find in the October issue of the *Dental Cosmos*, a group who are trying to keep orthodontia as a part of dentistry, to break down the specialization again. There are many things on the horizon that we have to recognize; and unless as a Society we do take notice and heed of those things, we are going to find ourselves again just where we were thirty years ago, with the same wrangles and the same ideas. It was not that group of earnest and honest workers that I had in mind, but it is this other group that is growing up, and that we have not paid any attention to and do not recognize. There were those in the dental profession and the public that prior to 1915 did know the difference between orthodontia and "teeth straightening." They recognized that difference, but there is beginning to be a relapse. We, ourselves, recognize that there is a difference between the two. We should in some way go back to the old educational methods that they used—if they were methods—to advise the public, and what is more to advise the profession, that there is a difference, and that this getting back to where we were thirty years ago should stop. It was to bring up these points that I put my paper in the form that I did, and I am very grateful because through the discussion I think we can clear up the matter that is before us, namely, that it is up to the Society and to the members to take heed and begin to try to straighten out the situation before it gets beyond us.

THE BEHAVIOR OF THE TEMPOROMANDIBULAR JOINT IN RESPONSE TO THE MYOFUNCTIONAL TREATMENT OF DISTOCLUSION*

ALFRED PAUL ROGERS, D.D.S., A.M., BOSTON, MASS.

IN 1918 it was my privilege to bring before the profession the results of certain experiments I had been carrying on for a number of years relative to the value of nonmechanical treatment of malocclusion. Since that time considerable development has taken place in relation to this phase of orthodontic treatment. The intervening years have not as yet developed any theories or arguments which in any way depreciate the value of the conclusions reached at that time. Like most innovations in professional development, these ideas were not accepted without reservations by the ultraconservative members of the profession. Nevertheless, there is, at the present time, a continued and healthy interest in this method of treatment among both the older and the younger leaders in the profession.

The main idea at the beginning was to stress the importance of the development of function. It was asserted that "the power to heal was the property of the living tissue, but that the power to recover function, the function of the joints and muscles, was the property of the patient's brain and will." It was explained that without the patient's active assistance the orthodontist's best efforts were often in vain.

In attending to the criticisms which occasionally have been made, I am convinced that for the most part they have been based upon a misconception of the underlying fundamental principles, together with the lack of appreciation of the changes which may be brought about by consistent and prolonged effort on the part of the patient.

The principles of the treatment were explained to the profession under such titles as, "Increased Function in the Treatment of Dental Anomalies," "Making Our Facial Muscles Our Allies in Treatment and Retention," and "Living Orthodontic Appliances." Titles of this nature never seemed to me to be completely satisfactory. It was not until a year or more ago that there was pronounced a really satisfactory phrase to cover this particular form of orthodontic treatment. We are now indebted to Dr. B. E. Lischer for a descriptive phrase which seems to be much more comprehensive. During a lecture before the American Society of Orthodontists in November, 1933, Dr. Lischer, when referring to this method of treatment, made use of the phrase "myofunctional therapy." It is my belief that henceforth this title should be used when referring to treatment of a functional nature adapted to the correction of malocclusion. I am much indebted to Dr. Lischer for giving us this very comprehensive descriptive phrase.

*Read before the New York Society of Orthodontists, New York, November 12, 1934.

The purpose of this contribution is to bring to your attention some particularly significant results in relation to the temporomandibular articulation following this method of treatment. It has been this particular phase of treatment which has received the greatest amount of criticism. It therefore is my belief that this phase has been the least understood by the profession at large. It has been difficult for some to believe that changes in tissue brought about by increased function could be produced to a sufficient extent to bring about finally the complete correction of distoclusion. That changes must take place in the temporomandibular articulation appeared difficult of comprehension.

Our attention is confined in this paper quite exclusively to that type of distoclusion wherein the head of the condyle takes its position well down upon the eminentia articularis when the patient places his arches in the correct mesiodistal relation.

There is another type of distoclusion in which this does not seem to occur which does not call for the application of any form of inclined plane apparatus, and which is very frequently corrected by the application of the pterygoid and masester-temporal exercises with little or no mechanical aid other than that being required for the correction of arch form.

During the earlier years of its development, radiography had not been able to supply us with adequate pictures of the temporomandibular joint. It was difficult, therefore, for us to furnish a complete picture of the fundamental changes which took place during treatment. My own experiences, however, were vivid enough to convince me beyond reasonable doubt that important changes did take place, and that distoclusion very frequently yielded to this method of treatment in a marvelously satisfactory manner, but now since radiography has developed to the point where it provides us with a definite check, there is no longer any doubt as to the value of those functional exercises which have been described as the masseter-temporal exercise and the pterygoid exercise. The correction of distoclusion by the myofunctional method requires an understanding and appreciation of the physiomechanics of the parts involved, supported by an understanding of the cellular changes which take place in response to functional activity where modification of form or position is desired.

In treating this type of malocclusion it is true that practically all the muscle groups of the face and jaws are more or less concerned, and must all be given individual attention appropriate to the requirements of the individual under treatment. In the treatment of distoclusion the position of the mandible is of basic importance; therefore those muscle groups which are more particularly concerned in the varied movements of the mandible are the ones which naturally should receive our first consideration. The mandible is most directly under the control of the external pterygoid group of muscles.

Leon Williams reminds us that, "The movements of the mandible are guided by the action of the condyle in the glenoid cavity at all times when the teeth are not in contact. The temporomandibular joint is, of necessity, entirely subordinate to the action of the cusps of the upper and lower teeth when they touch and come into action, and, for this reason, the space between

the head of the condyle and the floor of the glenoid cavity is filled with tissue and fluid that is more or less compressible. There is no compressibility about the enamel-covered cusps of the teeth. In the closing action of the jaw the moment the cusps of the teeth come in contact they assume absolute control of the completion of that action."

Therefore, the external pterygoid group for corrective purposes is the first to solicit our attention. This muscle has one office peculiar to itself—that of holding the condyle fixed on any part of the eminentia articularis to which it may be drawn in movements of the jaw. For this service the muscle is admirably fitted by the great width of its origin, which enables it to brace the condyle so firmly against the part above, and in front of it, that the jaw is fixed even when wide open as firmly as if the condyle were hinged in that position. The manner and locality of its insertion is also of importance, some of the fibers being inserted into a depression in front of the condyle and also into the corresponding part of the interarticular fibrocartilage. This strong and beautiful group of muscles from its peculiar situation has great influence over all movements of the jaw.

It may be easily understood, then, that the initial steps of treatment of a myofunctional character are confined to the use of these muscles, but there are, at the same time, in some cases preliminary steps of a mechanical nature which must be considered. I am referring now to the removal of abnormal occlusal interferences which tend to restrict the action of the pterygoid muscles in performing the tasks which are set for them.

At the very beginning one's attention must be directed to the form of the dental arches, then the necessary correction undertaken. This is usually a simple, direct mechanical process. During the accomplishment of this mechanical correction there should be instituted a simple exercise involving the external pterygoid group. In prescribing this exercise it will be found helpful to keep in mind the excellent work done by Leon Williams in his experimental studies of the temporomandibular joint. In these experiments he demonstrates the extent of the normal rotation area, and points out the normal anteroposterior and lateral excursions in the incisal region. A conception of this work is a guide to the operator in imparting his instructions to the patient, and if kept in mind will prevent the excessive movements which have sometimes been employed by those who have not realized their importance. Therefore, when the preliminary pterygoid exercise is prescribed, the patient is instructed not to project the mandible beyond the limits which may be considered normal.

This exercise consists in the simple act of placing the mandibular incisors anterior to the maxillary incisors if the maxillary incisors are in their normal position. In the individual case in which the maxillary incisors are much protruded, no attempt is made to place the mandibular incisors anterior to the maxillary incisors, but advanced only to the mesial limits of the normal excursional area. The patient is then instructed to relax the pterygoid muscle and allow the mandible to recede to the point where the arches are in their relatively correct mesiodistal relation. It is important that a correct conception of this simple exercise be borne in mind at all times, because I believe it is at this

point that many have erred. The continued performance of this exercise gradually develops the physiologic habit relative to the mandibular position which is entirely within the normal rotational function of the mandible. This exercise may be considered as a setting-up drill resulting in the necessary added tonicity and control. I should like to point out that its performance during that period of mechanical preparation in correcting the arch form greatly enhances the patient's ability to maintain the correct mesiodistal relation without strain when the time arrives for the use of the inclined plane apparatus. During its performance in distoclusion cases, the head of the condyle is drawn well down on the distal surface of the eminentia articularis and may be held in that position for the duration of the exercise. This preliminary exercise is carried on during the period which is utilized in the mechanical effort to bring about the necessary change in form of the maxillary and mandibular arches. The length of time varies according to the extent of movement and the rapidity of the tissue changes necessary for the indi-

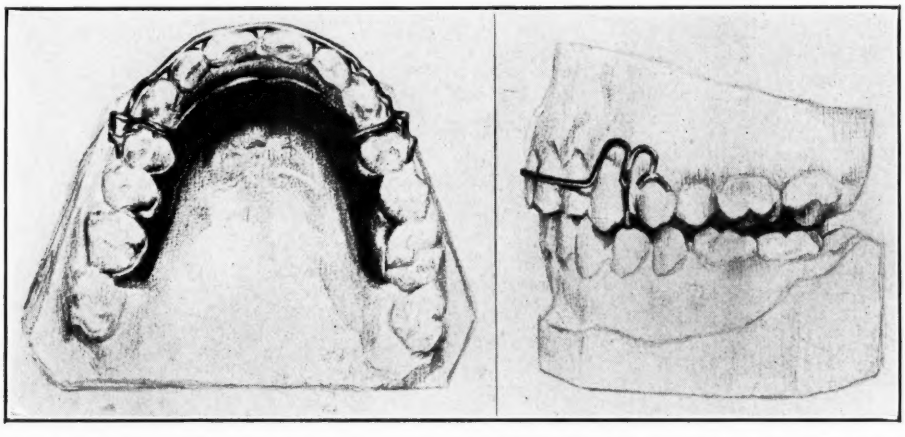


Fig. 1.—Modified Hawley retainer for use in the treatment of the type of distoclusion under discussion.

vidual. When the maxillary arch has reached its correct arch form and the arches are placed in their normal mesiodistal relation, an infraversion of the molars and premolars may frequently be observed. In this type of case the patient must be provided with an apparatus which will insure the maintenance of the position of mechanical advantage. This is usually attained by some form of inclined plane either attached to the anterior teeth which are in normal relationship or a neatly constructed removable apparatus, such as the Hawley retainer with a carefully designed inclined plane. (Fig. 1.) When this stage of treatment has been reached, the patient is ready for instruction in the exercises which are designed to strengthen all the muscles of mastication and which will gradually bring about important physiologic changes which, when established, insure the permanent and satisfactory correction.

The next important exercise at this period is the one known as the masseter-temporal exercise, but which, of course, in its performance includes other groups such as the internal pterygoid group of muscles. This exercise is valuable during some phase of the treatment of all forms of malocclusion,

and is especially valuable as a retentive measure, ofttimes entirely dispensing with the mechanical retention of the maxillary arch. This exercise consists in the contraction and relaxation of the masseter-temporal group of muscles with the mandible held in a static position and in the position of mechanical advantage created by the use of the inclined plane apparatus. This exercise should never be permitted unless the patient is able to place the mandible in its correct position. The child should be instructed when learning this exercise to place the tip of the forefinger over the masseter muscle near the angle of the mandible to enable him to sense the contracting and relaxing movements.

This brief description of the methods employed up to this point suggests that our attention now be directed to the temporomandibular articulation in order that we may make observations in reference to the changes which must occur before the correction is complete. As was pointed out earlier, during

Fig. 2.—Recent radiograph of distoclusion case treated years ago when conclusions were reached by digital examination of the joint together with the reestablishment of normal functional movements of the mandible.*

the performance of the pterygoid exercise the head of the condyle is shown well down upon the eminentia articularis—following the application of the inclined plane apparatus the head of the condyle remains temporarily fixed in this position. It is during this phase of the treatment that some have entertained doubt as to the wisdom of such procedure, and having been unable to follow the process through to its conclusion have felt justified in condemning the wisdom of this method of practice, forgetting that under functional stimulation the changes of form must occur in various parts of the mandible and alveolar process; and that the head of the condyle while it is temporarily fixed in its advanced position gradually is seen to return to its former position in the glenoid fossa.

The movements of the condyle prior to the development of the radiography of the mandibular joint were followed by the simple method of digital exami-

*Because of the necessary reduction in size of the x-ray pictures shown in Figs. 2, 4, and 5, the essential features of the temporomandibular joint have been accurately retraced in order to make it easier to interpret the prints.

nation. In my own experience I have had no misgivings in respect to the changes which were taking place, for the reason that the apparent developments indicated by the digital examination were substantially supported by the fact that the patient gradually exhibited the inability to retract the mandible to the extent possible before the treatment was instituted, and that

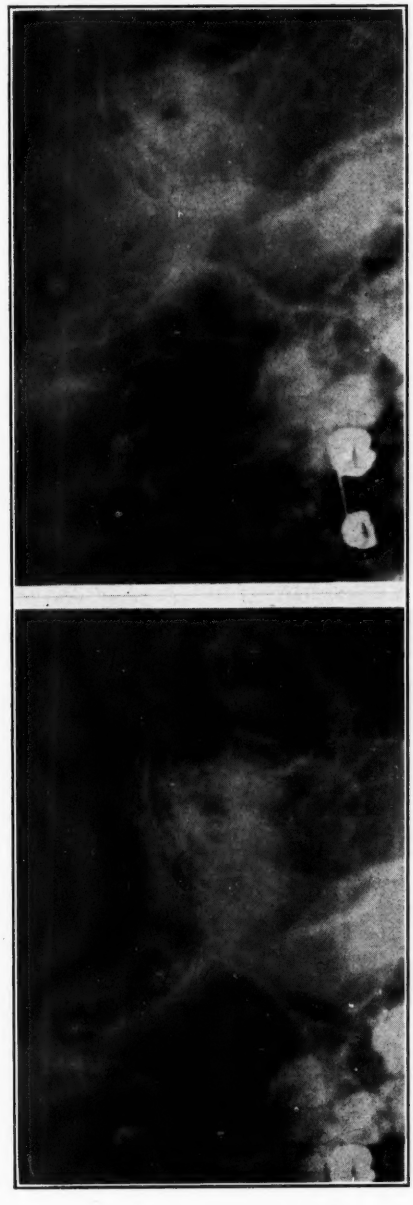


Fig. 3.—Radiographs of the temporomandibular articulation representing a typical distoclusion.

gradually the manner of movement of the mandible changed from the habitual recessive movement to that approaching the normal, and that finally upon the completion of the condyloid position the patient's mandible always exhibited normal relationship during mastication and in the act of speech. (Fig. 2.) Now with the advance of radiographic methods it has given us the utmost satisfaction to be able to trace these mandibular movements so accurately

that there can be left little doubt as to the correctness and permanence of result in this method of treatment.

We have used two methods of radiographic examination which it might be well at this time to describe. In the first method the approach is made from the opposite side several inches above and slightly posterior to the auditory meatus—that is, from the left if we desire to produce a shadow of the right articulation. The tube is directed downward and forward to the joint. Although this angle may be in line with the axis of the fossa in one plane, it is necessary to direct the ray downward in order to avoid the petrous portion of temporal bone and other structures at the base of the skull. This gives a fairly accurate anteroposterior relation but tends to distort the shape of the condyle and eminentia articularis. An intensifying screen is used with a two-second exposure at an eight- to ten-inch distance.

The other method that we have used requires the use of a lead filter which excludes all but the central rays. The approach is made through the sigmoid notch and the ray directed slightly backward and upward. The ray does not start to spread until it passes the ramus on the tube side, which gives an unobstructed view of the opposite joint. This angle is in line with the fossa on the horizontal plane but does not follow its axis. It also shows the root of the zygoma and the styloid process of the temporal bone. This technic does not require a screen, since the tube is set very close to the head. A six-second exposure is the average time. I am indebted to my associate, Dr. Walter J. Sly, for the descriptions of these two methods and all the radiographs of the temporomandibular articulation which are presented at this time.

At present it is our custom with all distoclusion cases to take two radiographic pictures of the articulation before treatment: one showing the condyle in its habitual position with the mandible in distal position, the other with the arches held in the correct mesiodistal relation with the condyle drawn well down on the eminentia articularis. (Fig. 3.) Following these preliminary pictures others are taken during the progress of treatment. These subsequent pictures show the gradual recession of the head of the condyle back to its normal position in the glenoid fossa. (Fig. 4.) It must be remembered that during this period the arches are continuously held in their correct mesiodistal relation by the use of the inclined plane, and that the masseter-temporal exercise is being continued daily. When the condyle finally reaches its normal position, the distoclusion may be considered corrected, and it is found at the same time that the arches remain without effort in correct relationship. (Fig. 5.)

In order to assist in the interpretation of the radiographs of this difficult area, we have undertaken the study of radiographs of the dry specimen. It was thought by making repeated comparisons between the radiographs and the dry specimen that we might provide ourselves with a means that might aid us to a clearer reading and a more definite understanding in our interpretation.

In order further to clarify our understanding we experimented with thin metallic markings securely taped to definite points on the eminenta articularis, the lower exterior border of the glenoid fossa and along the deep portion of

Fig. 4.—Radiographs showing gradual change in the position of the condyle during treatment but yet incomplete.

Fig. 5.—Radiographic evidence that the condyle has again reached its normal position in the glenoid fossa, establishing the fact that treatment of the distoclusion is complete.

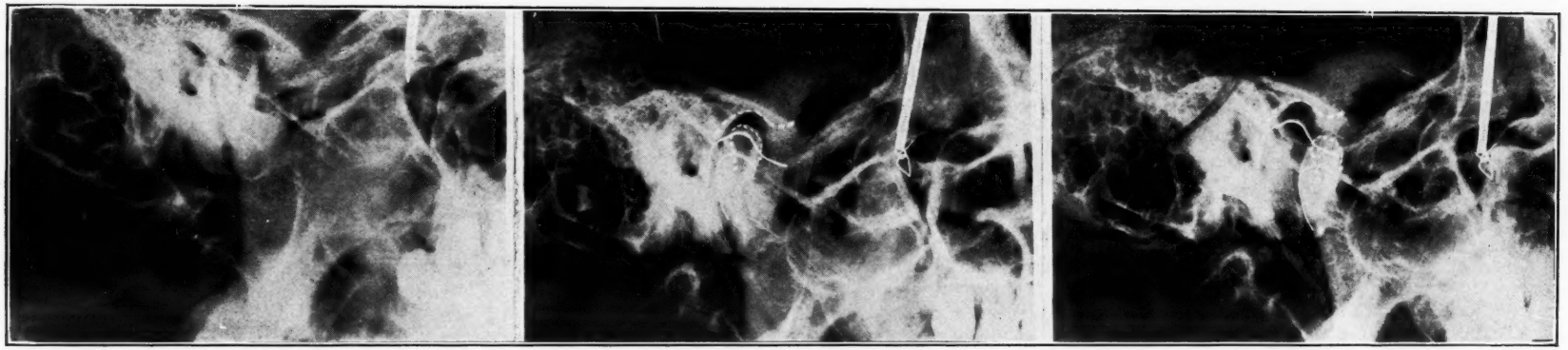
the glenoid fossa. In addition to this, identification points were marked on the head of the condyle—then before the radiographs were taken an artificial articular disk was placed between the head of the condyle and the articulating surface of the glenoid fossa. Thus a relatively correct relationship between the condyle and the fossa was established. Radiographs were then taken with each method previously described. Following this we were able to make comparisons between the radiographs of the dry specimen and thus could sense more definitely the relative position, and at the same time have a better understanding of the amount and extent of distortion. With this method of approach we found that we were better able to interpret the radiographic shadows of our living subjects, and thus eliminate a certain amount of misinterpretation, and at the same time secure a more accurate mental picture of the progress in development.

In examining the radiographs of the dry specimen after the markings have been placed, it will be observed that a clearer conception is at once possible; so that when interpreting radiographs of the living subject the eye and the mind are given a greater scope, and therefore more accurate interpretation is possible.

The radiographs of the temporomandibular articulation which illustrate this article were taken by the two methods: one in which the rays are directed vertically from behind and slightly above the mastoid process, giving a view of the articulation on the opposite side of the skull; the other view taken through the sigmoid notch.

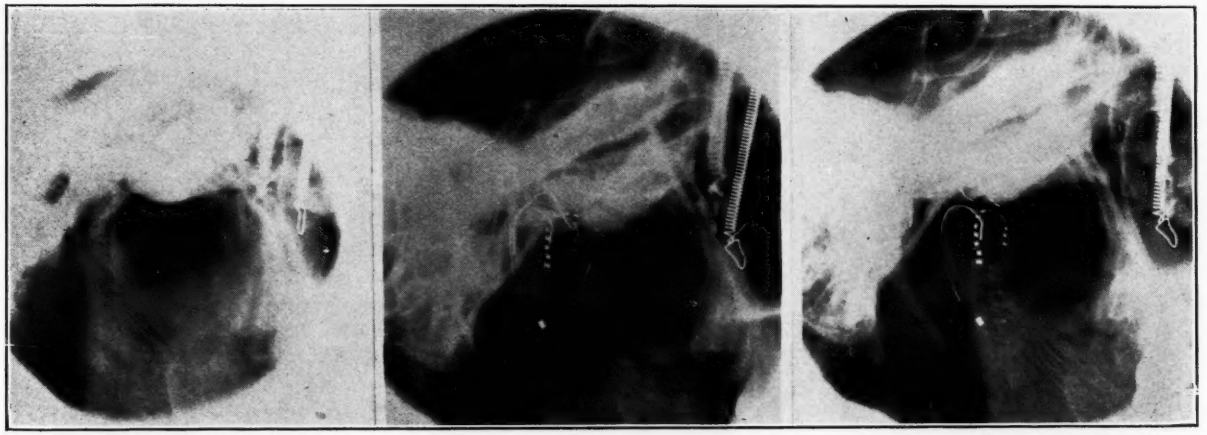
In viewing these illustrations it will be helpful if you will imagine yourselves in the exact position of the radio tube, bearing in mind that you are observing shadows reflected upon a flat surface; and that these shadows are necessarily distorted because of the fact that it is difficult to obtain a perfect silhouette of the tissues on account of density of surrounding parts. Figs. 6 *A* and 7 *A* are radiographs of the dry specimen without markings, and Figs. 6 *B* and *C* and 7 *B* and *C* are of the same specimen taken from as nearly as possible the same position, with the difference that designating strips have been placed in various locations. As you study these radiographs, remember that you are viewing them from the opposite side of the skull. The metal markings are of two kinds, the continuous line and the interrupted line. The latter in each case are the farthest from your view, the upper being along the outer and lower border of the glenoid fossa. The second interrupted line represents the contour of the division between the middle third and the outer third of the condyloid process. The upper continuous line represents the deepest part of the glenoid cavity throughout its entire extent. The lower continuous line represents the line between the middle and the inner third of the condyloid process, so that the distance between the lower interrupted line and the lower continuous line represents the middle third of the articular surface of the condyle.

This description of the metallic markings applies to those radiographs taken with the vertical ray from the position above and behind the mastoid process. The majority of the radiographs presented will be from this position. Therefore in making your interpretations it will be helpful to bear in mind



A. *B.* *C.*

Fig. 6.—Radiographs of dry specimens given as a preliminary study to aid in the interpretation of radiographs of the living subject.



A. *B.* *C.*

Fig. 7.—Radiographs of dry specimens given as a preliminary study to aid in the interpretation of radiographs of the living subject.

these metal markings and their changed positions during the two positions of the condyloid process which are illustrated. In Fig. 6 *B,* where these metallic marks appear, the condyle is in the functional position characteristic of distoclusion cases. Fig. 6 *C* shows the position of the condyle characteristic of distoclusion cases when the patient is biting in neutroclusion position before correction—in those cases in which an infraversion of the molars and premolars is present.

Fig. 7 represents the same area, but the area is now being viewed through the sigmoid notch. The metallic markings now appear in very different positions, but the interpretations will be simplified if it is remembered that the interrupted markings are farthest away and that the upper continuous marking represents the floor of the glenoid fossa. I believe for the purpose of our investigations that the view through the sigmoid notch is preferable, but inasmuch as it has been necessary for me to draw on material produced some time previous to the preparation of this paper, and before we had developed a satisfactory radiographic technic through the sigmoid notch, it will be expedient to bear in mind more specifically the markings of those pictures which represent the radiographic technic in which the rays are directed downward from behind and above the mastoid process.

Let me emphasize in conclusion that in following this method of treatment, the operator has two or three important checks which provide him with an assurance that definite structural changes have occurred, and that the treatment is now complete and in all probability permanent. The first check is the observation that the patient during the act of speaking holds the jaw in its proper position. That is, there is no evidence of a recessive movement during the performance of this function. The second check is that during the act of mastication the movements of the mandible are normal; and the third, always thought of in conjunction with the two former, that the radiographic survey shows the head of the condyle to be well seated in its normal position in relation to the glenoid fossa. It is now impossible to obtain a picture of the temporomandibular articulation that is anything but normal unless the mandible is thrust so far forward that the teeth are out of occlusion aneroposteriorly, and it is impossible for the patient to carry the condyle down the distal border of the eminentia unless he protrudes the mandibular arch beyond the normal position, or unless he opens his mouth widely as in yawning.

It must be remembered that at no time during this form of treatment is the condyle actually out of its functional position. There is no temporary deformity existing other than the utilization of the variability in function which, fortunately for our purpose, this variable joint is capable of assuming.

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DISCUSSION

Dr. Ashley E. Howes.—I want to ask Dr. Rogers if he has been able to find in the unilateral distoclusion differences from the x-ray pictures on either side or both sides of the joint, one side of the joint different from the other in these cases.

Dr. S. Lewis Kregerman.—After hearing Dr. Rogers I found I was as much confused as I was before I came up here. Undoubtedly the position of the condyle is the thing that is a question of perennial interest because when we are dealing with distoclusions we have to bring about a change of the anteroposterior relationship of one jaw to another, and that is when we might get some movement or change in the condylar position or shape.

Oppenheim approached the question by finding out the immediate changes surrounding the tissues of the teeth that were moved. Kronfeld a year ago brought us the investigations of Karl Breitner, of Vienna, who approached the subject from the same angle as Oppenheim, but he wanted to find out the change that took place in the entire mandible when pressure was brought to bear on the teeth in the changing of the anteroposterior position. He found something similar, almost identical, to the changes that Oppenheim found in moving the condyle forward. He experimented with monkeys, for 83 days, bringing the mandible forward en bloc. He found when there was a pressure on the condyle against the eminentia or border of the glenoid fossa, that there was a resorption both of the anterior angle of the condylar head and of the glenoid fossa, and at the same time in keeping with Oppenheim's findings there was a deposition in the posterior. In other words, Oppenheim investigated what was going on around the tooth and the immediate structure surrounding the tooth when they were subjected to pressure and changes, but Breitner applied the same theory and investigated the changes not only in the immediate structures surrounding the tooth but in the entire mandible, the changes in the ramus, the body of the mandible, and the condyle.

While there might have been a change in the position of the condyle, the size of the condyle remains the same. Now when these pictures are made—of course the first picture is merely an incidence in a series or phases of changes that are going on all the time, and another picture may be another incidence. I was wondering whether they could not be confused simply because the condylar head is the same at all times due to the deposition keeping in harmony with the resorption.

Dr. Rogers said that the condyle gradually receded into the glenoid fossa. If we start to bring about a different relationship in the rows of the mandibular teeth to the maxillary teeth, if it is not a change in the condyle, is there by any chance some change in the molding of the form of the jaw through either a bending or a reshaping? Does not the body of the mandible express its lengthening in this changed relationship between the two arches; and if there is a changing in the shape, is there not a change in the angle, or is there resorption? So many things are involved about which we do not yet know that I am afraid it will be some time before we are cognizant of them all. However, through the progress and improvement of our x-ray technic we shall go forward, and eventually we may learn just what is going on in that mandible.

Dr. Lawrence W. Baker.—When I saw that the temporomandibular articulation was to be discussed, I could not resist the temptation to bring along some slides which will illustrate the experiments which I made many years ago on the interference with the function of occlusion. I believe these slides may shed some light on some of the questions that have been asked.

(Slide.) You can readily see what was done there. Of course, the anthropologists have been more interested in the change in the shape of the skull, the bones of the skull than in the temporomandibular articulation. The anthropologists are also interested in the changes in the bone due to the interference of the function of mastication. That is a dog; I started interfering with the function of occlusion when that animal was very young, and it took many months to bring about that result of unilateral function. You can see the change: the one that is functioning is larger than the other and on a different plane.

(Slide.) Here is the mandible of a cat. You can readily see that interfering with the function on this side interfered with the growth of the body of the bone, and also made a change in the condyle.

(Slide.) Here is this same animal many years later. You can readily see that we interfered with the occlusion on this side and interfered with the occlusion on this side, and here is a normal function and a malfunction. Of course, you see normal development here. These

animals were all of a litter, and I started on this work just as early as I possibly could in the animal's life. Lack of function and lack of development you see in the ramus, and also you can see the difference between that condyle and this interference with the development here of the ramus and condyle. Compare those and the normal function and normal development throughout. I was very glad to hear Dr. Rogers make the statement that the occlusion of the teeth determined the shape of the condyle, and I think he is perfectly right. It is function that does it.

(Slide.) Here we see these skulls viewed from the posterior aspect as far away, of course, as we can possibly get from the function of occlusion, and you see this is the nonworking side, the lack of development. On the nonworking side you remember the condyle was buried here, and also the ramus. If you could only take some of these skulls in a recent state and just press the bone between your fingers you would find on the nonfunctioning side that bone was soft and pliable, you could bend it in.

(Slide.) Here is a very interesting slide from Dr. Squire. When we come to fundamental work, we always have to go back to that great master; this is one of his specimens. This person had lost so many teeth that in masticating he had to swing this jaw to one side to get any occlusion at all. You can readily see what swinging the jaw to one side caused, what change it brought about in the condyle. This condyle is way forward on the sphenoid bone. This was the functioning side, and this was the passive side. It took years and years to get to that state. I have had that specimen in my own hand, and the teeth are all worn off, worn down, caused by swinging the jaw to one side as he had to do in order to masticate.

(Slide.) Here is a rather interesting case of distoclusion. You see that is what I did, and this is what nature did later after years of function. We used, of course, the inclined plane as Dr. Rogers did, and other retaining devices.

(Slide.) There is the other side. I will show you the appliances.

(Slide.) This is what we brought about mechanically, and here we see the position after years of constant functioning. Of course we have seen on the screen many examples of cases done by mechanical devices, plus artificial function, that is muscle training; and as far as I can think out, the results are about the same.

Dr. Rogers has had good cases in which he used his artificial function (muscle training), and I wish there was some way or some measure whereby we could see just how much value there is in it. It occurred to me that if we could take a group of cases, say 15 or 16, and get those arches perfectly normal, and remove all inclined planes, all appliances, and then continue with the artificial function, the muscle exercises, if they held there, we could find out how much there is in that, because if there is great value in it we must all know it, and use it. The only way I can see that we can use it is by conducting some tests along the line that I have mentioned, because artificial function is so bound up with normal function that it is difficult to separate them, and unless they can be separated we cannot get any light on it. I make this statement in the interests of research because I would be interested in separating these two, and I would be interested in finding the quickest and best and shortest way.

Dr. Alfred P. Rogers.—I should like to emphasize one special point, that in correcting these cases the operator must be extremely careful not to go beyond those physiologic limits to which I have referred.

As a point of diagnosis, I think that you are all convinced that radiographs of the temporomandibular articulation must certainly now become one of the routine practices in your office. By so doing, we shall improve our technic and check on our results.

AN INHERITANCE OF DWARFED OR ABSENT MAXILLARY LATERAL INCISORS IN THREE GENERATIONS*

ROBERT BRADLAW, L.D.S., L.R.C.P., M.R.C.S., ENGLAND

IT IS generally agreed that there is a tendency among the more highly evolved races toward the loss of the maxillary lateral incisor, concurrently with the reduction in the size of the jaws.

Dwarfed lateral incisors are exceedingly rare in the colored races, Du Housset reporting one of the few cases on record, and indeed complete absence occurs in considerably under 1 per cent.

J. Middleton Shaw found neither degeneration in form or size, nor absence of lateral incisors in the Bantu races, nor did Campbell in the Australian aboriginals, or Azoulay and Reynault in the Papuans. On the other hand, according to Hrdlicka, degenerate lateral incisors occur in about 3 per cent of white Americans, while Rose states that there is complete absence in 2-4 per cent of Central Europeans and in 6 per cent of Scandinavians.

On the facts it is reasonable to assume that the defect is blastogenic rather than somatogenic, that is to say, it is a transmitted characteristic rather than a simple failure of developmental process. Indeed, Fry holds the view that harelip and cleft palate frequently occur in the children of women with the defect. Herbert has reported a case of a woman, both of whose maxillary lateral incisors were missing; one of her children had a cleft palate on one side with the corresponding lateral incisor missing, while another child had both lateral incisors missing. Again Siemens, when investigating the subject, found no pair of similar twins in which one was affected and not the other.

The case, which it is my privilege to show, is one with an inheritance of dwarfed or absent incisors in three generations. As in the other reported cases, the characteristic appears to be a simple dominant without sex limitation. Both grandparents had the defect, and of their direct descendants there are eleven persons affected to three unaffected. Of those with the defect nine are male and two are female. The importance of these cases is, in my view, not so much the difficulties such cases may present in deciding the best way in which to treat them, but the fact that they throw light on an orthodontic factor which is still insufficiently appreciated by many people.

Since DeVries, Correns and Tschermak, in 1900, drew the attention of biologists to the work which Mendel had carried out nearly forty years before, much has been done to elucidate the problems of inheritance and germinal variation.

*Transactions of British Society for the Study of Orthodontics, 1933.

Although it cannot always be done, especially in these days of very small families, it is possible, in a large number of cases, to forecast with accuracy

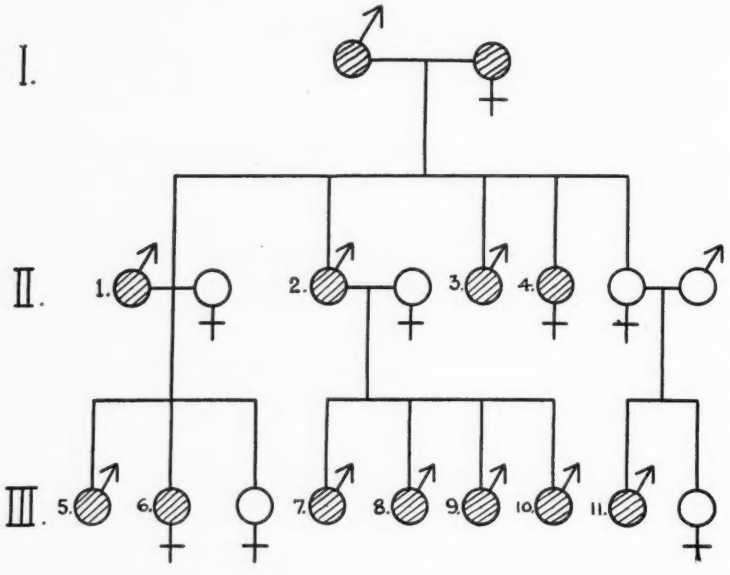

Fig. 1.—Inheritance of dwarfed or absent maxillary lateral incisors in three generations.

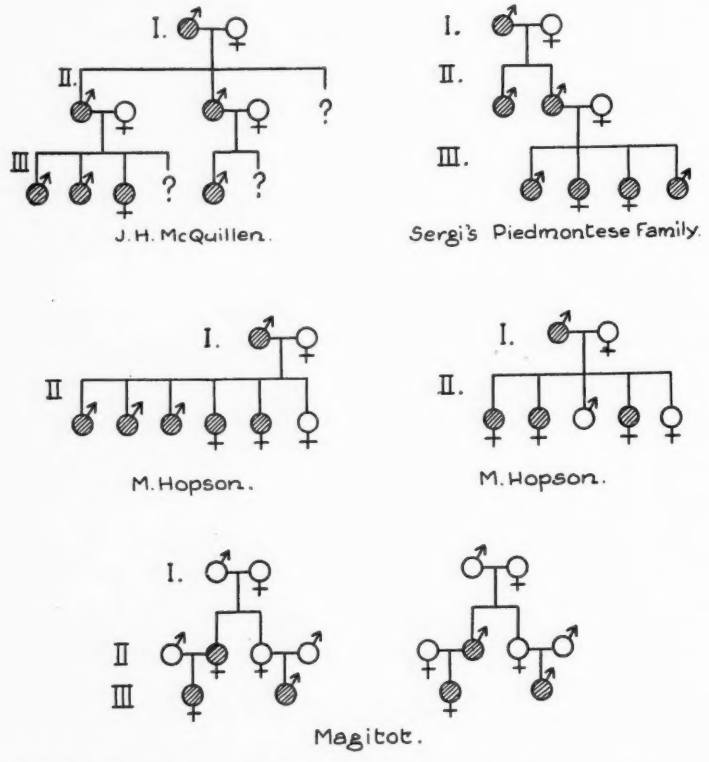

Fig. 2.—Recorded families with inheritance of absent or dwarfed maxillary lateral incisors.

how certain characteristics will be transmitted and in what members of a family they may be expected to appear.

If the male and female components of the zygote, or fertilized cell, have the same tendency with respect to any characteristic, then the cell is called homo-

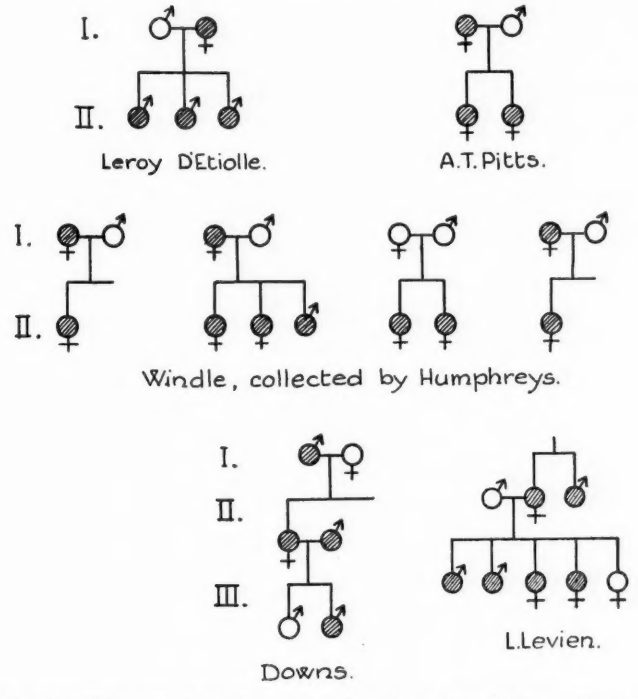

Fig. 3.—Recorded families with inheritance of absent or dwarfed maxillary lateral incisors.

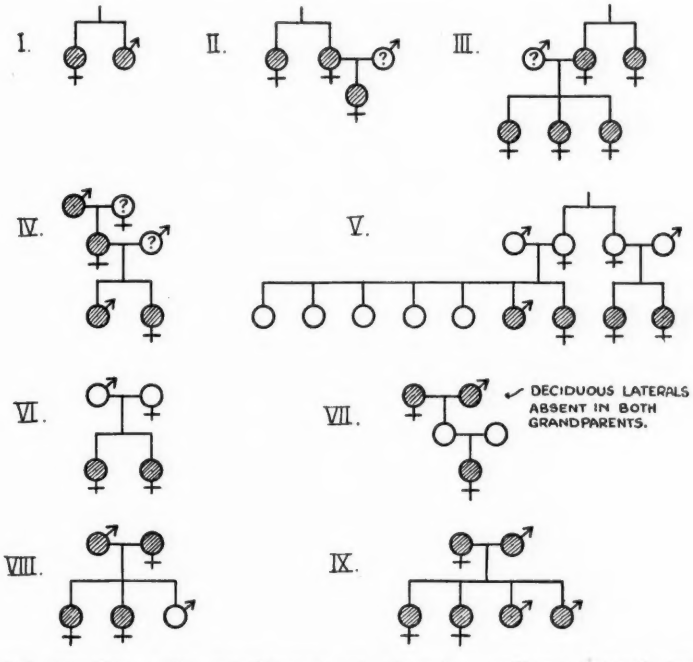

Fig. 4.—Recorded families with inheritance of absent maxillary lateral incisors. (J. H. Badcock.)

zygous for that particular characteristic. If, however, the inherited tendencies are dissimilar, then the individual produced is said to be heterozygous. The

tendency in one direction, however, may be stronger than the tendency in the other direction, in which case the first tendency is called the dominant, and the second tendency the recessive.

Now, from a study of genetics, we know that if a person who is homozygous for a characteristic, marries some one who is homozygous for its alternative, then the children will have a blended inheritance. Should such individuals inter-

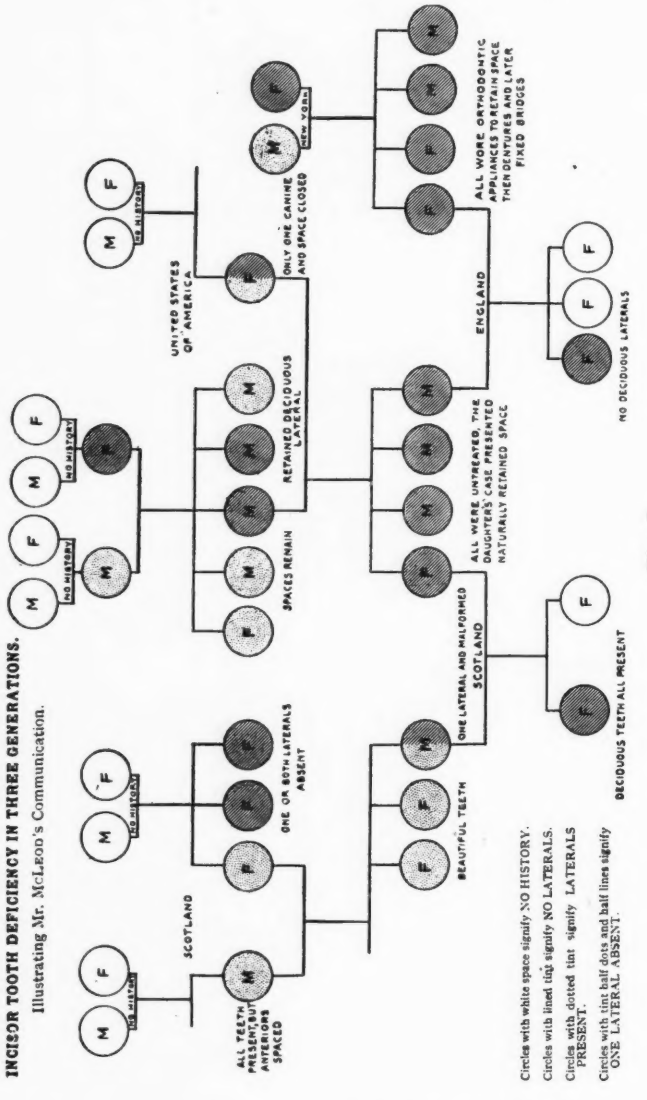
INCISOR TOOTH DEFICIENCY IN THREE GENERATIONS.
Illustrating Mr. McLEOD's Communication.
SCOTLAND
ALL TEETH PRESENT BUT ANTERIORS SPACED
ONE OR BOTH LATERALS ABSENT
BEAUTIFUL TEETH
ONE LATERAL AND MALFORMED
SCOTLAND
SPACES REMAIN
RETAINED DECIDUOUS LATERAL
UNITED STATES OF AMERICA
ONLY ONE CANINE AND SPACE CLOSED
ALL WERE UNTREATED, THE DAUGHTER'S CASE PRESENTED NATURALLY RETAINED SPACE
ENGLAND
ALL WORE ORTHODONTIC APPLIANCES TO RETAIN SPACE THEN DENTURES AND LATER FIXED BRIDGES
NO DECIDUOUS LATERALS
DECIDUOUS TEETH ALL PRESENT
Circles with white space signify NO HISTORY.
Circles with lined tint signify NO LATERALS.
Circles with dotted tint signify LATERALS PRESENT.
Circles with tint half dots and half lines signify ONE LATERAL ABSENT.

Fig. 5.

marry, then the characteristics of the next generation can be worked out exactly. There will be three individuals showing the dominant type, only one of whom will breed true, and there will be one individual who not only will not have the dominant characteristic, but whose children will never have it. If, however, a person who is heterozygous for an abnormality, which is the most usual form, marries a person who is homozygous for its alternative, then half the children will be normal and half abnormal.

If two people, both with the same abnormality, marry, then three-fourths of their children will be abnormal, and one-fourth normal.

These facts are demonstrable in the case I am showing here, and in the very interesting sibship shown by Mr. McLeod earlier in the year.

In many of the recorded cases, however, the history, unfortunately, is not sufficiently complete, or the family is too small for us to recognize the force of heredity in what may appear to be the sporadic occurrence of some abnormal variation.

DISCUSSION

Mr. G. Northcroft said that this communication would be of great interest and use to members of the Society in the future, because it formed a collected record of many cases besides his own, and brought them all together. It could be added to from time to time as these cases came under notice.

Mr. J. H. Badcock said that this was an extremely interesting subject. He thought the experience of most of them was that in probably more than 50 per cent of these cases an hereditary factor could be traced, and when this was not traceable it was very often because there was not sufficient knowledge of the family. He regretted to say that he himself had not dealt with these cases in the careful and scientific way that Mr. Bradlaw had done, and he had not complete histories, but he had put down a few notes on certain cases that had come under his notice which might be of interest simply as emphasizing what Mr. Bradlaw had already said. He had one case of a man in whom the lateral incisors were missing, and they were said to be missing also in his brother. Another case was that of a woman who had one lateral incisor missing, and the same condition was found in her mother and in her mother's sister. In a family of three sisters, two had both lateral incisors missing, and one had one lateral incisor missing. A woman who had two lateral incisors missing had a father who showed the same condition, as did her daughter, and, he believed, a son. The next case was that of a man in whom the lateral incisors were missing, and it was the same with a sister and also a cousin on the mother's side. The man was one of a family of seven. Another case was that of a woman whose lateral incisors were missing, and whose father showed the same condition, while there was one lateral incisor missing in her sister. Another woman had both lateral incisors missing, and here there was a history of the grandfather and great-grandfather both having no maxillary lateral incisors. In another case both father and mother were deficient in maxillary lateral incisors, and two of their daughters, but not a son, in a family of three. The same sort of thing applied to missing teeth generally, and in another case the mandibular premolar was missing and the mother's aunt was said to have had two teeth missing. In another case, a woman, both lateral incisors were missing, and the same was true of two brothers and a sister, also of the mother and father. In yet another case all the second premolars were missing, and the same was true of a daughter and an aunt.

Mrs. Michaelis said that she had come across an interesting case of a boy with missing lateral incisors. He was the only member of his family who had that condition, but the case was interesting because the history showed that while the parents and grandparents had no teeth missing, there was an increasingly large spacing in the incisor region. Was that pure coincidence or could that spacing be leading up to an absence of the teeth? The grandparents had a moderate spacing and the mother of the boy an extremely wide spacing, particularly in the central incisor region. This was not one of those spacings which came on later in life, but it had been there all the time. The boy, in addition to the absence of the lateral incisors, had also a spacing.

Mr. Harold Chapman said that it was really extraordinary that the author of the communication should have found nine individuals in three generations, seven of whom showed this characteristic. When he was secretary of the Society he tried to get the late Prof. Sir Arthur

Thomson to give a paper on heredity; he had declined the invitation, but he mentioned that one case of three generations was worth a dozen cases of two generations.

The President asked what Mr. Bradlaw, from the practical point of view, thought of the appearance of these patients. Had he done anything to counteract the spacing due to the absence of lateral incisors? Had he removed any teeth in the mandible to balance the absence in the maxilla? The speaker had a case in which two lateral incisors were missing in the maxilla and four premolars in the same patient. He took an x-ray photograph of the jaw, but found no premolar under the deciduous teeth. After extraction three months later the appearance was quite good. He thought it was a good thing to reduce the mandible in such cases and so allow the two arches to balance, possibly taking a little bit off the canines to make them look more like the missing lateral incisors.

Mr. Bradlaw, in reply, said that he had been very much interested in Mr. Watkin's remark about treatment. Unfortunately, only four persons with this defect had actually come under his care; the remaining members of the families were under the care of other practitioners. In two individuals the removal of teeth, for caries or other reasons, and the insertion of a denture, solved the difficulty, while the other two were satisfied with their appearance, so that the question of treatment did not arise. He thought that Mr. Badcock's contribution to the discussion greatly added to the value of the records made on this subject. He felt that the Society could make a valuable contribution, not only to the science of genetics, but to the science of otrhodontics from the genetic point of view, by the collection of statistics of families regarding not only such a defect as this, but similar defects. A great deal could be done by careful recording to show the way in which nature worked in the production of orthodontic faults.

THE CRISIS IN ORTHODONTIA*

PART I

3. CRITICAL REVIEW OF THE PUBLICATIONS ON ORTHODONTIA BY B. GOTTLIEB, B. ORBAN, A. M. SCHWARZ, AND J. A. MARSHALL†

ALBIN OPPENHEIM, VIENNA, AUSTRIA

(Continued from page 335, April)

The second case, from Grünberg's collection, is the more illustrative for the question of achieving permanent results, as an attempt was made to retain the new occlusion by specially constructed bridges. Fig. 16*A* shows the original models of this case, treated in 1909; the patient was then thirty-two years old. Fig. 16*B* shows the condition three years later, in 1912, at which time it was considered a perfect success. The corrected occlusion and the decrease in the overbite may be ascertained by comparing Fig. 16*A* with Fig. 16*B* and 16*C*. To prevent a backward drifting of the mandible, strong extensions were soldered to the distal end of the maxillary bridges, which rested against the distal surfaces of the last mandibular molar (Fig. 16*B*). To relieve the bridges from muscular traction and from the tension of the soft tissue, intermaxillary elastics were worn in addition. In Fig. 17 we see the condition in 1925, sixteen years after accomplishing the jumping and its mechanical fixation. The bridges are intact, but they are (similar to Angle's case) tipped mesially in the mandible and distally in the maxilla; the mandible has drifted back to its former position, and the overbite is as deep as originally.

By comparing the photographs in Fig. 18 we can follow the cosmetic changes, brought about by the different positions of the chin: *A* is the original condition before treatment was started; *B* shows the profile after the "jumping," and *C* the relapsed condition after sixteen years.

Even such a mechanically retained "success" cannot eventually resist the continual influence of all the forces trying to bring back the mandible.

The third case is my own latest observation. Fig. 19*A* shows the original condition. In April, 1931, a splint had been cemented upon the anterior maxillary teeth, with the result that months later (December, 1931) the mesiodistal relations were normal and also the deep overbite was much improved by the shortening of the anterior teeth (Fig. 19*B*). The patient was then referred to me. On account of the loosening of several bands, I was forced to remove the splint; the case was considered a success and was dismissed without retention. In April, 1932, four months later (Fig. 19*C*), the molars again occupied their original Class II position, and also the deep

*From the Department of Orthodontia of the Dental Institute of the University of Vienna.

†Translated in abbreviated form from *Ztschr. f. Stomat.* Supplement to No. 22, November, 1933, published by Urban & Schwarzenberg, Vienna and Berlin.

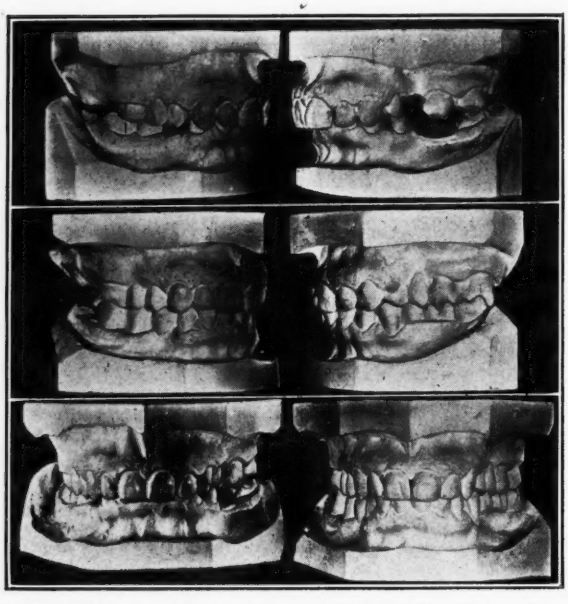

Fig. 16.—Case of Grünberg treated by jumping the bite and retained by specially constructed bridges. *A*, Before treatment (1909). *B*, After treatment (1912). *C*, Front view before (left) and after (right) treatment. The deep overbite is improved.

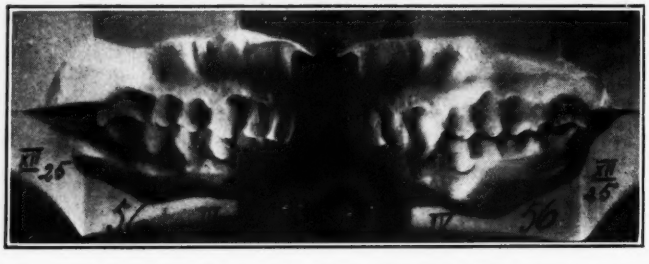

Fig. 17.—Same case as shown in Fig. 16, in 1925. Gradual retrusion of the mandible in the course of sixteen years, in spite of retention by bridges; deep overbite.

A. *B.* *C.*

Fig. 18.—Photographs of patient whose models are shown in Figs. 16 and 17. *A*, Original profile (1909); mandibular retrusion. *B*, After treatment (1912); mandibular retrusion corrected. *C*, Profile in 1925; relapse of mandible into retruded position.

overbite had again fully developed. Now the usual treatment of Class II cases was started, and in Fig. 19 *D*, *E*, and *F*, we see the condition after fourteen months of active treatment, just before the retaining appliances were cemented to place. The overbite is normal; the spaces between the canines and first premolars are not entirely closed, in order to allow for further eruption of the canines. The lingual occlusion of the maxillary right first molar has developed within the three months between the last two visits of the patient. During the fourteen months of active treatment, the patient, who lives out of town, was in my office only seven times.

Schwarz bases his recent defense of the jumping method upon the histologic findings of Gottlieb and Orban and of Breitner; however, he uses these findings without further clinical evidence or any observation of even one case that could be considered as a permanent success.

Schwarz states (Scheff, Vol. 6, p. 472, and Fortschr. d. Orthodontik, No. 1, 1932): "One group (of appliances for the treatment of distoclusion cases)

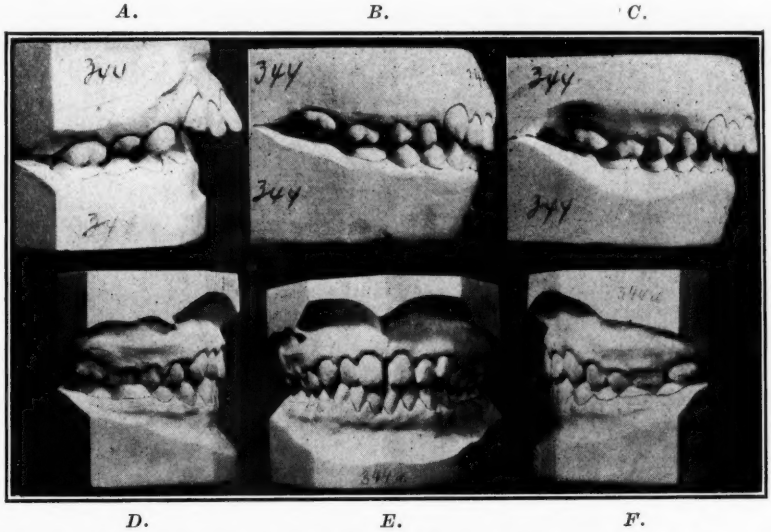

Fig. 19.—*A*, Original model, April, 1931. *B*, Model after removing the bite splint which had been cemented on the maxillary anterior teeth (December, 1931). *C*, Condition four months later (April, 1932). Recurrence of Class II relation of molars and of deep overbite. *D*, *E*, *F*, Results following typical treatment of Class II (June, 1933).

is based on the principle of jumping the bite and makes use more or less of the functional forces of the jaws. The principle of 'jumping' finds a new scientific justification and support in the histologic findings of Breitner."

Breitner himself, however, expresses the following opinion from his experimental work with "jumping" (Ztschr. f. Stomat. **28**: 634, 1930): "The severe destructions on the roots of those teeth that were overloaded by caps for the purpose of jumping may be interpreted as indicating that this movement of teeth cannot be considered as a favorable one. . . . Such severe damages are found only in teeth that were moved very quickly and with great force. . . . *The proportion between the intensity of the changes on the teeth themselves and the changes in the mandibular joint and angle is a very unfavorable one;* the forces of jumping are by far too strong and out of proportion to the possible anchorage."

Whereas Schwarz refers to the findings of Breitner as "scientific support" for recommending again and again the jumping method, Breitner arrives at the diametrically opposite conclusion!

(4) In Schwarz's writings, as far as they are considered here, we often find statements by which previous opinions are, after long or short intervals, completely contradicted. A few of these contributions may be enumerated without any further comment.

(Ztschr. f. Stomat. **26**: 65, 1928): "The histologic slides of Oppenheim of deciduous incisors of monkeys, moved by ligatures, showed signs of most extensive resorption and apposition in the region of the alveolar margin. This process of resorption and apposition diminishes constantly toward the apex and is never found at all on the apex itself."

(Fortschr. d. Orthodontik, **1**: 399, 1931): "On account of the presence of the germ of the permanent tooth, the apical region of pressure was explained by the eruption of this tooth. The newly formed bony spicules on the apical side of pull were only separated by a thin layer of old bone. . . ."

(Scheff, Vol. 6, p. 379): ". . . for the treatment of Class II cases in the deciduous denture there can be admitted only the influencing of the mandible as a whole . . . since an individual movement of the deciduous teeth is prohibited by the presence of the permanent tooth germs."

(Scheff, Vol. 6, p. 499): "The jumping method is justified from the biologic point of view, if it is performed in very young patients and the appliances are fixed as far as possible only on the deciduous teeth."

(Scheff, Vol. 6, p. 433): "It is not permissible to look for absolute measurements in figures of the forces to be used in order to obtain the most favorable biologic effect. Individual procedure and much attention and delicacy are required."

(Fortschr. d. Orthodontik **2**: 160, 1932; and INTERNAT. J. ORTH. **18**: 351, 1932): "The present biologic division demands of modern orthodontic appliances that the forces used must be objectively measurable."

Orthodontia is a science based on experience, and it sometimes happens that principles once upheld and considered correct are revoked because of new discoveries and newly gained experiences; I myself have not hesitated to do so. But if Schwarz within a very short period of time, even within the course of a few months or a quarter of a year, defends and argues diametrically opposite viewpoints of principal and fundamental questions, this proves only that he did not take the time necessary for testing and proving.

(To be continued.)

MUTILATED OVERBITE CASE*

GEORGE R. MOORE, D.D.S., ANN ARBOR, MICH.

HISTORY.—The patient, a girl aged nineteen years and six months, was first examined February 9, 1928. In consequence of an early separation from other members of her family, I was unable to get a complete history of her early development. The patient, however, reported having suffered no serious illness at any time during her life and was, from all appearances at that time, in an excellent state of health. Casts of her mouth are shown in Fig. 1. Note the normal anteroposterior relation of arches with a deep overbite confined to maxillary central incisor region and mandibular incisor and canine regions only. She was a normal breather with normal lip function. The overbite was not, in this case, symptomatic of deficiency in vertical development of the face. The mandibular right lateral incisor had been extracted at an early age by some dentist who hoped to correct the irregular alignment of mandibular anteriors but who had no knowledge or concern over consequent malocclusion which he might produce. Fig. 2 shows radiographs taken several months after treatment was started. The patient had broken several appointments with the resultant tipping of mandibular first molars, and I referred her for this radiographic examination to check for damage to supporting tissues. There was some, as is shown, but mandibular appliances were removed temporarily. Note the amazing number of pulp stones, and yet an analysis of the blood soon after showed normal calcium content. I wanted to show as a part of this report another radiographic examination, but was unable to get the patient to come to the office again for it.

Attributed Etiology.—From the foregoing it will be seen that the deep overbite in this case was contributed to very largely by the premature extraction of mandibular right permanent lateral incisor.

Diagnosis.—Mutilated case complicated by retrusion and extrusion of maxillary central incisors, mild protrusion of maxillary lateral incisors, retrusion and extrusion of mandibular anteriors.

Treatment.—From April, 1928, to May, 1930, excepting for two three-month summer vacations, treatment was active. This was administered by means of maxillary high labial wire with soldered lingual sections ending at the canine regions and intended to stimulate lateral expansion. With the aid of hook extensions, maxillary central incisors were intruded and tipped labially. At the same time, a mandibular lingual wire with loops in the premolar region was used to elongate the mandibular arch anteroposteriorly and expand it laterally. This accomplished, I proceeded to open up space in the mandibular right lateral incisor region by means of a combination of simple and recurved

*Presented to the American Board of Orthodontia.

Fig. 1.

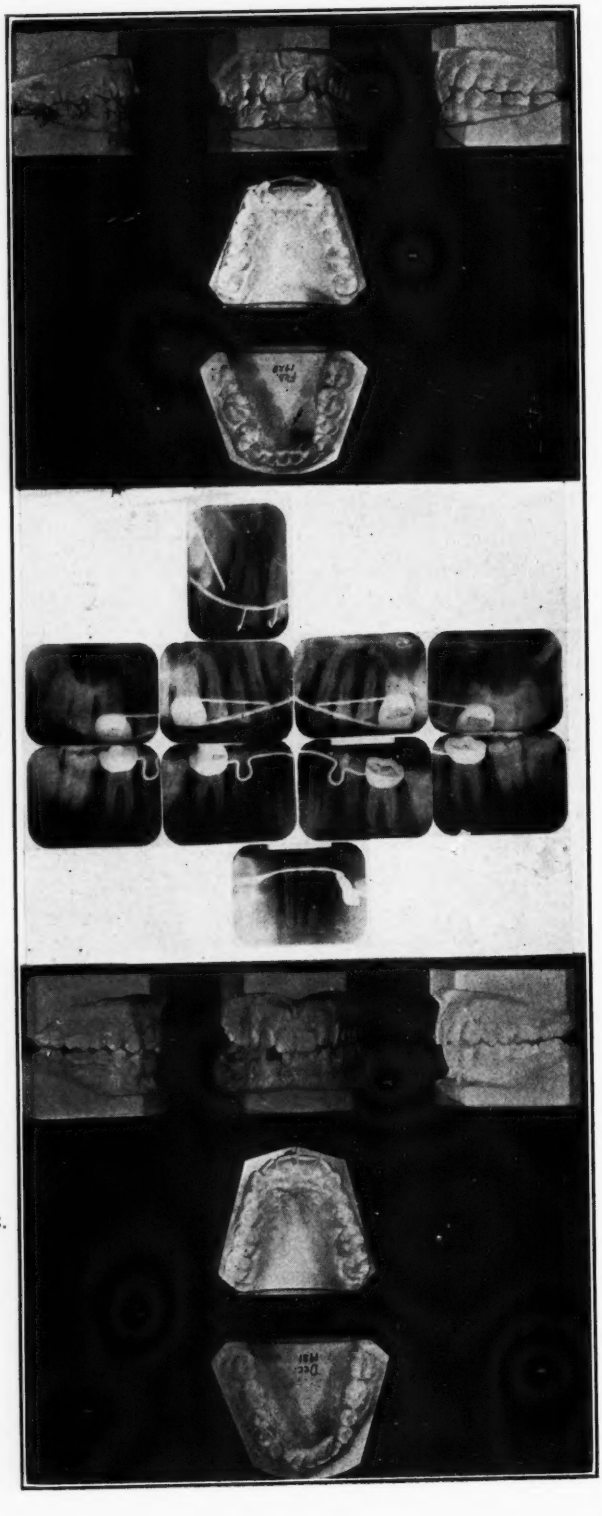

Fig. 2.

Fig. 3.

springs. In May, 1930, there was adequate space for an artificial mandibular lateral incisor, which was supplied as part of a modified Hawley retainer, which is still being worn.

Results.—When this patient first appeared in the office, she was concerned over impingement of the mucous membrane lingual to the maxillary incisors, as well as over the repulsive appearance of the exuviated maxillary central incisors. From Fig. 3, which represents casts made in December, 1931, eighteen months after appliances were removed, it will be seen that both objectionable features of this case have been corrected. The patient may not have a

Fig. 4.

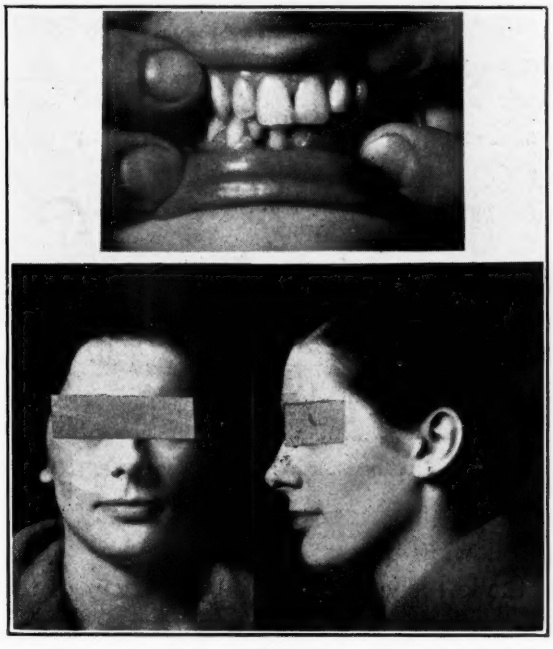

Fig. 5.

perfect dentition, but, considering the time spent in treatment and the patient's age, the results have been very satisfactory. Figs. 4 and 5 show photographs made in April, 1932.

Prognosis.—In the past two years the case has relapsed no more than would be expected along with the settling of the occlusion after removal of appliances. The patient wishes to wear the removable retainer for another year, which may be a fortunate circumstance inasmuch as establishment of mandibular incisors in their new positions will thus be more permanently assured.

Although a much more satisfactory occlusion might have been assured by the administration of preventive measures early in the patient's life, I am convinced after having treated this and many other adult cases presenting problems of varying complexity that there is a wide field for this kind of treatment.

TREATMENT OF UNILATERAL DISTOCLUSION*

C. J. Vosmik, D.D.S., Cleveland, Ohio

HISTORY.—Girl, aged twelve years. The facial form of the father was normal; the mother had bilateral distoclusion. The facial form of the child was normal. The diseases of childhood consisted of measles at six years and whooping cough at eight years. The tonsils and adenoids were in a healthy condition. The maxillary left second deciduous molar had been lost at six years. The general health of the patient was normal at the time orthodontic treatment was begun.

Oral examination revealed the teeth and surrounding tissues in a healthy condition.

Attributed Etiology.—The premature loss of the maxillary left second deciduous molar may be considered the etiologic factor causing malocclusion.

Diagnosis.—Impressions were taken in modelling compound from which casts of the denture were constructed.

Fig. 1 shows views of casts made April, 1929, at the beginning of treatment. The case was classified as a unilateral distoclusion.

Treatment.—The teeth were restored to a normal functional and anatomic relationship by the following plan of treatment. A distal movement of maxillary buccal teeth on the left side and a mesial movement of the mandibular teeth on the same side.

Molar bands carrying half round lingual tubes and 0.040 in. buccal tubes were placed on all four first molars. Treatment was begun with the insertion of labial wires constructed of 0.040 in. round wire in both the maxillary and the mandibular dental arches. The maxillary labial wire carried 0.022 in. wire spring loops just anterior to the buccal tubes and hooks for intermaxillary elastics. The mandibular wire had no auxiliary attachments and was used merely to prevent the mesial tipping and rotation of mandibular molars when the elastics were used. Intermaxillary elastics were used from the time treatment was begun; and by keeping the maxillary labial wire from lying in contact with the maxillary incisors, by gradually opening the spring loop on the left side, the full force of the elastic was placed against the maxillary left first molar, thus causing it to move distally and the mandibular first molar to move mesially. After the molars were placed in their proper mesiodistal relationship, removable lingual wires, with loop springs extending into the interproximal space to move the canines and premolars mesially or distally, were placed in both the maxillary and the mandibular arches.

*Presented to the American Board of Orthodontia.

Results Achieved.—The patient presented for treatment April 12, 1928. The treatment progressed satisfactorily, and the teeth were almost in normal relationship when in January, 1930, it became necessary to remove all appliances from the mouth because the patient sustained a fractured skull in an accident. When the patient returned for further treatment in July, 1930, examination

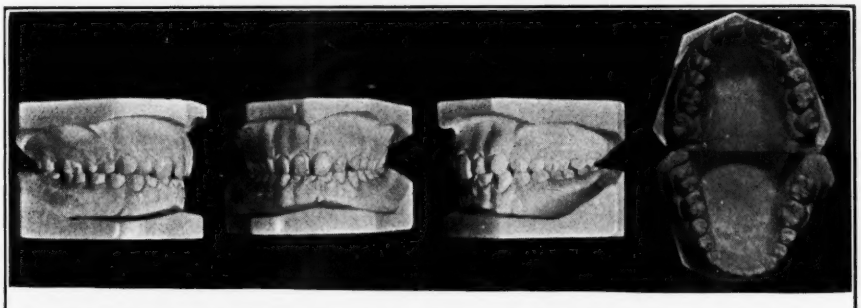

Fig. 1.

Fig. 2.

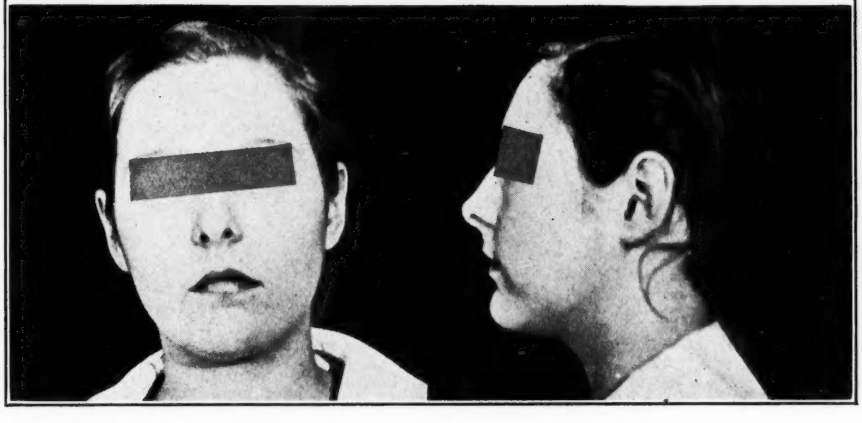

Fig. 3.

proved that adjustment in the relationship of the teeth had continued after the appliances were removed and that they were then in a normal relationship. No further use of appliances was made.

Fig. 2 shows views of casts and Fig. 3 shows photographs of patient, January, 1932.

Prognosis.—The prognosis is favorable that a normal functional and anatomic relationship will be maintained.

AN EFFORT TO INTERCEPT MALOCCLUSION*

LELAND R. JOHNSON, D.D.S., M.S.D., CHICAGO, ILL.

THE patient, M. J., was first seen at the age of five years and two months. Both arches were narrow, and developmental spaces were very slight. The jaw relation was normal and the general arch form good. There was almost a full overbite. Labium frenum was normal; tonsils and adenoids had not been removed; and the patient was a normal breather. There was no definite history of rickets, although the child was ten months of age when the first incisor erupted. The x-ray pictures showed no absorption of the deciduous incisor roots. The teeth were all present and apparently developing normally. No treatment was attempted at this time, and the patient was placed under observation to permit natural widening of the arches if possible.

At the age of six years and four months the developmental spaces were only slightly larger and the mandibular right central incisor had been shed. X-ray pictures showed no absorption of the maxillary deciduous incisor roots; absorption was just beginning on the mandibular deciduous lateral incisors; and the mandibular right permanent central incisor was erupting lingually to the mandibular right deciduous central incisor, which was only about one-third absorbed. The first permanent molars had erupted, but the cast of the maxillary arch made fourteen months before would fit the new mandibular model perfectly, which indicated that if width was to be gained the case must receive some stimulation to start it. The tonsils and adenoids had been removed two months previously. The mandibular left deciduous central incisor and the deciduous lateral incisors were extracted, and orthodontic treatment was begun.

The etiology of this case is an arrestment of development of both arches due to unknown causes. The patient has always been under close supervision as to diet. The general health has been excellent, and nothing in the history points to the reason for this arrest in development.

A mandibular lingual appliance was placed, using the deciduous second molars for anchorage. This was worn four and one-half months and a retainer placed. The retainer consisted of a band on each mandibular deciduous canine with a labial wire soldered from canine to canine. It was made this way to permit the normal tongue pressure to move the mandibular incisors into their normal positions. New x-ray pictures were made at this time, and they showed that the maxillary central incisors were erupting normally and that the mandibular incisors had sufficient room. Three months later the mandibular incisors were in position and the retainer was removed.

*Presented to the American Board of Orthodontia.

Nine months later the case showed the maxillary central incisors in good alignment, but the mandibular arch was a trifle narrow.

At nine years and four months of age the patient was again seen and showed the mandibular arch still narrow and the maxillary lateral incisors in torsiversion and the maxillary arch slightly narrow in the canine region.

A stereoroentgenogram was made of the maxillary canines and revealed that the canines are probably responsible for the rotation of the maxillary lateral incisors. The permanent maxillary canines are to the lingual of the deciduous canines. The deciduous molar roots show no absorption, and the mandibular deciduous canines are almost entirely absorbed.

Appliances were again placed to expand the arches and to rotate the lateral incisors. A mandibular lingual and a maxillary labial arch with lingual extensions and bands on the lateral incisors with spurs for rotation were used.

When sufficient width was gained and the maxillary lateral incisors were rotated, retaining appliances were placed and the case was placed under observation. Treatment may again be indicated before the permanent teeth are entirely erupted. With careful supervision this case should have a favorable prognosis.

Department of Dentistry for Children

BUILDING RESISTANCE TO DENTAL CARIES

MILTON RABINF, D.D.S., CLEVELAND, OHIO

FROM our present knowledge of dental caries we have every reason to believe that the resistance of teeth to caries is in direct proportion to the resistance of the body to other infections. There are three cardinal principles in the maintenance of good health; they are exercise, sanitation, and nutrition. We can incorporate and use the principles of all three in preserving teeth.

Exercise of the teeth, that is, the chewing of coarse foods, is one of the essential factors in secondary dentin deposits. Beust says that trauma acts as an irritant to cause a sclerosis of the tooth. The frozen food diet of the Eskimos, whose teeth are reputed to be superior to ours, bears this out. Tobacco chewers' teeth are sclerosed, most probably because of the trauma caused by chewing the coarse leaves of tobacco.

Coarse foods tend to aid in sanitation, for in the act of mastication these foods scour the tooth surfaces. Before we can discuss sanitation, we must assume that bacteria play an important part in the etiology of caries. The development of a resistance to caries does not permit one to harbor the virus with impunity. It would be just as foolish to build up an immunity to typhoid and then deliberately consume infected milk or water in order to see whether or not the antibodies could overcome the virulence of the typhoid bacillus. In that direction we can only suggest a zealous hygienic measure.

Resistance offered by the tooth to caries involves a serologic immunity, dependent upon the quality of the blood, and a physical resistance dependent upon the physical constitution of the tooth substance. In youth the serologic immunity is important, for both the enamel and the dentin are permeable and accessible to the infiltration from the mouth and the pulp. If the chemicoparasitic theory is correct, then the toxins and the neutralization of the acids must be overcome by the blood and lymph. The physical resistance manifests itself in later life in a sclerosis.

Beust, in his experiments, has summarized the resistance of the tooth to caries in the following manner:

1. A tooth's resistance to caries or other tooth-destroying agents increases in proportion to the amount of its sclerosis.

2. Beyond a certain maximum amount of primary dentin formation in intact teeth, further contraction of the pulp is ordinarily attended by a tubular sclerosis.

3. Sclerosis is an expression of the factors of resistance possessed by a tooth.

4. Hypoplasias, erosions, abrasions, and decay cause premature formation of the sclerosed areas under the seat of trauma. Secondarily, a hastened contraction of the pulp cavity occurs in such cases.

Nutrition has proved itself to be a vital factor in the formation and the maintenance of good health. In dentistry we are concerned with vitamins and mineral metabolism, with special reference to calcium metabolism. The amount of carbohydrates, fats, and proteins in a diet is important so far as the general health of the individual is concerned; and this has an indirect bearing upon the condition of the teeth. In their metabolism they form organic acids which must be overbalanced slightly (pH 7.4) by the alkaline ash of the rest of the diet. The acid-base balance is one of the determining factors in the calcium metabolism and in the resistance of the body in general. Meat, fish, cereals, and breads are foods of excess acid ash. Milk, fruits, and vegetables are foods of excess basic ash.

The subject of vitamins as a whole is essential, but there are only three that seem to deal directly with the teeth. They are vitamin A, vitamin C, and vitamin D. Vitamin A has been shown to have a definite effect upon the growth and protection of the body against infection. Howe has found that in a deficient vitamin A diet, the odontoblasts do not lay dentin but form bone instead. Other workers have shown that a deficient vitamin A diet has a deleterious effect upon the calcium metabolism in the body. The best sources of this vitamin are dairy products, vegetables, and cod liver oil.

The effects of a scorbutic diet are decidedly untoward. The metabolism of the individual is disturbed. The calcium content of the blood, muscles, and bone tissues is below normal. The bones become fragile, and there is a tendency toward hemorrhage. Howe has shown that a diet deficient in vitamin C in the guinea pig causes the odontoblasts to cease forming dentin within five to seven days, and in ten days the tooth is greatly softened. After vitamin C is introduced, the odontoblasts rearrange themselves and resume their activity. Fresh fruits and raw vegetables are the foods in which vitamin C is found in abundance. Oranges and tomatoes head their respective groups as to vitamin C content.

The results of a vitamin D deficiency have been carefully studied in human beings. May Mellanby has done more than any other worker to show the effect which this vitamin has on teeth. She has demonstrated that vitamin D has a direct bearing upon the formation of secondary dentin. Mrs. Mellanby found that in a group of children fed irradiated ergosterol in addition to the regular institution diet, the increase of caries over a period of one and one-half years was only one-third that of the control group. At present there is a controversy among those prominent in research as to the advisability of administering vitamin D, as such, as a preventive measure, though they all agree that it should be prescribed as a therapeutic agent. Sherman says that whole milk contains more vitamin D than heretofore accredited. The natural sources of vitamin D are sunlight, milk, eggs, and cod liver oil.

Minerals control directly or indirectly all metabolic processes. Ordinarily the various mechanisms in the body preserve a physiologic balance of the minerals

unless the deficiencies or excesses are greater than these mechanisms can handle. Absorption and excretion of these minerals are influenced by the amounts of other minerals present. That is, phosphorus and calcium are dependent upon each other for their utilization, copper upon iron, potassium upon sodium, etc., and all of these, with magnesium and manganese, are interrelated. Prolonged acidosis causes a loss of minerals from the body, calcium and potassium being especially affected.

In the ordinary diet the mineral that is usually deficient is calcium. The amount of sodium chloride usually added to food is more than sufficient to meet the sodium requirements. Potassium, copper, iron, manganese, and magnesium are relatively abundant in meat and plant tissues. Phosphorus is abundant in meats. The best source of calcium is milk, but here the average diet is deficient to such an extent as to destroy the mineral equilibrium. The calcium in vegetables cannot be utilized to so great an extent as that in milk, though vegetables help in the attainment of the proper amount.

Calcium metabolism is dependent upon the amount of calcium consumed, the mineral equilibrium, the acid-base balance, vitamins, and the endocrine system. According to Sherman, the amount of calcium that is conducive to optimum storage in growing children is one gram, or its approximate equivalent, in one quart of milk daily. There are individuals who seem to have a diet which is optimum according to our present knowledge of nutrition and yet show manifestations of a faulty calcium metabolism. One is inclined to believe that the endocrine glands are not functioning properly. There has been no definite work in this field in relation to teeth, but we have every reason to speculate that therein lies our trouble when such cases do occur.

As yet there is no universal agreement as to a specific factor that is responsible for the arrest or control of caries. There is a growing tendency to regard as sound Boyd and Drain's policy of the use of a diet as complete in all respects as our present knowledge permits. In nutrition we must not consider a minimum or maximum amount of food but rather an optimum quality.

Boyd and Drain, after successfully arresting caries in as short a time as ten weeks, have set forth the following rules that should guide one in prescribing an optimum diet:

1. Sufficient protein to insure growth.
2. Enough calories for full activity.
3. Residual ash should be neutral.
4. Abundant amounts of vitamins A, B, C, D, E, and F.
5. Abundant amounts of minerals, especially calcium, phosphorus and iron.
6. Foodstuffs reasonable in price and easy to obtain.
7. Should not require mineral accessories other than in foodstuffs.

To provide this optimum diet one should insist that the child eat daily:

1. Milk, one quart, plain, in soups, puddings, cereals, etc.
2. Vegetables, one serving raw. Two servings cooked, one of which may be potato.

3. Fruits. At least one serving raw, preferably citrus. Another serving of fruit, fresh or dried.
4. One egg, prepared any way but fried.
5. Butter, on bread, preferably dark, and vegetables.
6. Meat, not more than one serving daily.
7. Cereal, not more than once daily.

In dentistry, nutrition should primarily play the part of a preventive agent rather than a therapeutic agent. It is the aim of all medical science to prevent rather than to cure. There is case after case on record in which proper nutrition has proved itself a preventive measure against caries. I shall cite only one of these cases on file at the Forsyth Dental Infirmary, Nutrition Department. Two children, brothers, came into the Infirmary with perfect teeth—John S., seven years old, and James S., five years old.

Present Dental Condition: No cavities or anomalies in either case.

Prenatal History: Medical supervision from second month in both pregnancies. The diet was good, one quart of milk daily, ample fruits and vegetables, meat once daily, very little candy, pastry, etc.

Postnatal History: Both children were under the care of a pediatrician. Breast and bottle fed for six months. Supplementary foods were added according to the physician's directions.

Medical Findings: Negative in both children.

Present Diet: Average intake: Milk, one pint to one quart daily, considerable amount used in cooking. Vegetables, two daily besides potato, one raw. Fruit, juice of one and one-half oranges daily, and one other fruit. Meat, once daily. Eggs, five or six weekly. Cod liver oil, three teaspoons daily. Bread, chiefly dark, one or two slices at each meal. Candy, carefully supervised. One piece after meals allowed on alternate days.

In these same files of the Nutrition Department there are numerous examples of directly opposite conditions; that is, poor prenatal, poor postnatal, and poor present diets correlated with poor teeth.

Since teeth begin to calcify in the seventeenth week of fetal life, it is logical that preventive measures should begin before this period. The adult requires a daily consumption of about 0.67 grams of calcium, and it is estimated that the expectant mother should consume 0.9 grams at this period. This amount should be increased gradually to over 1.2 grams by the last six weeks of gestation, at which time the fetus requires 0.63 grams of calcium.

The other factors in calcium metabolism should be kept in mind in order to obtain an optimum calcium assimilation in the bodies of the fetus and mother. Though nature protects the fetus at the expense of the mother up to the limits of her resources, it is possible for the deficiencies to be so extreme as to affect the child. There have been cases on record in which rickets, beriberi, and pellagra have been observed in the first few weeks of life. These diseases must be of fetal origin, for the fetus normally stores enough vitamins (with the exception of vitamin C) to last until after the first month.

As a therapeutic agent, nutrition has as yet not been surpassed. Boyd and Drain have arrested caries in the torn-down bodies of diabetic children. May

Mellanby has controlled the incidence of caries in children of various institutions, and Eddy has done likewise. The arrest of caries in children outside of institutions and hospitals has been successful. The Nutrition Department at the Forsyth Infirmary, by changing the dietary regimen, was able to arrest caries to the extent of 79.21 per cent where good cooperation of the parents could be obtained.

The next period of the child's life needing special consideration is from birth to about two and one-half years of age. This is another portion of the life cycle in which we as dentists have practically no direct contact with the child. The child at birth has all his deciduous teeth and the permanent first molars in a state of calcification. Here, again, we cannot overemphasize the importance of a proper diet. It is in this period that the food habits of the child are established to a great extent.

With the proper medical care and a carefully supervised diet, our first contact with the child of two and one-half years of age finds him a radiant, healthy, and spirited individual. Physically there ought to be nothing the matter with him. His teeth are in perfect condition, and all his dental needs are a continuation of good diet, and regular periodic and systematic prophylaxis. He should grow up through youth and adolescence with practically no incidence of caries.

Because of dietary deficiencies or other metabolic disturbances, we may find, at two and one-half years of age, a child with defective formation of enamel. These imperfections may be easily eradicated by filling the pits and fissures. We should, after the correction of these malformations, question the mother as to the diet of the child and make such improvements as are necessary to forestall any other abnormality in the permanent teeth.

It is undoubtedly this period in which dental care for the individual should begin. Not only the correction of the defective diet but the regular periodic and systematic examination and prophylaxis should be inaugurated to last throughout the individual's life. In the first few years of the child's life, he should be seen at least every three months or more often if the case demands. If this routine is adhered to strictly, there ought to be little or no reparative work done during the person's life. Dr. Frank A. Delabarre, of Boston, estimates that the present adult spends approximately seven hours a year in the dental chair. He further states that as a result of early attention this could be reduced to two hours as a maximum.

Let us take into consideration the picture presented by the average preschool child of today. A recent survey of the preschool children of a small town in Massachusetts showed an average of 8.9 cavities and one abscess per child. This indicates that these children are not receiving the proper dental care. From the White House Conference Report we have every reason to believe that this condition is existing throughout the United States.

Under existing circumstances the preschool child is usually the problem child. He is the most difficult to handle, for he usually presents himself in the office in pain. He is more difficult to work on than the school child, for he is more fearful that the dentist will cause pain. He taxes the operator's skill and patience to the utmost. A short time after the complete eradication of the

manifestations of caries by both fillings and extractions, we rediscover incipient caries. Upon inquiry we usually find that there has been a nutritional deficiency.

Children from the ages of seven to twelve years present themselves with a little different attitude from the preschool child in that the schools have educated them to a slight degree in oral cleanliness and health betterment. They have had some fillings, but yet in the same Massachusetts report cited above, we find them with more than six open cavities and 1.8 abscesses per child. Here again we must do reparative and nutritional work, for the white areas of decalcification in the permanent teeth, which are due to malnutrition, may be obliterated by a high calcium and vitamin diet.

Correcting the diet of the child is a tedious task which increases with age. It necessitates the full cooperation of the parents. Usually it is not instruction in the kinds of foods which is primarily needed, but a lesson in psychology. Improper training from birth has oftentimes resulted in spoiling the child who has his own way in regard to the food he will or will not eat.

Our problem is advising the mother who comes in and says, "I cannot get Johnny to drink a drop of milk," or, "Mary just refuses to eat vegetables." While we should not force Mary or Johnny to eat, we can create a desire for food by stimulating the child's appetite. Correctly diagnosing the cause of a poor appetite is essential in order to advise treatment. Poor appetite is produced by physiologic and psychologic factors. The physical causes would usually need the cooperation of the physician. Disease processes, such as acute and chronic infections, organic diseases of the heart, lungs, and kidneys, anemia, and mental diseases, all need medical attention. Hygienic causes, such as lack of fresh air, exercise, and sleep, may be easily remedied. The dietary habits may cause physiologic loss of appetite by overfeeding, too short intervals between meals, too many rich foods, lack of vitamins, constipation, and too many sweets and starches. These may all be easily corrected if diagnosed properly.

The factors that cause the psychologic loss of appetite are primarily negativism, desire for attention, imitative nature, oversolicitation, and emotional strain at the table or before eating. After obtaining a history of negative physical causes, we must suspect a psychologic factor as the etiology. It is impossible to prescribe a routine procedure to follow to overcome the causes of anorexia (non-hunger) that may arise. Negativism, desire for attention, and oversolicitation go hand in hand. Sometimes the child finds it great fun to do the opposite from that which is expected of him and to have the rest of the family much concerned. To feel neglected and then suddenly find that one is the center of things by refusing milk is certainly pleasant. "After all, sister Mary may get better grades in school, or baby brother may be cute, but still I'm one of the family and like to be noticed," runs the child's reasoning.

Indifference usually cures negativism and oversolicitation. If the child finds that no one cares whether he eats or does not eat, and if he is made to go hungry without causing any concern to anyone, the child will find it advisable to eat. Children are imitative in nature. If dad does not care for vegetables, Tommy certainly will not like them, for Tommy holds dad as his ideal. It is up to every adult in the family to set an example for the child in food habits as well

as in manners and other behaviorisms. The table should be a place which is free from scoldings for previous bad behavior, free from criticism of table manners, and free from discussion of anything that may arouse unpleasant memories. The child should be included in the agreeable conversation accompanying the meal. The atmosphere of the table should be clean, and the food served as attractively as possible.

Sometimes it is possible to appeal to the child directly. Children from the ages of six to eight years are interested in extrinsic rewards, such as stars. Through the National Dairy Council one can obtain posters depicting various phases of health promotion, upon which the child can paste a star for every four glasses of milk he drinks daily or for the vegetables he eats. This is an inexpensive procedure for the dentist and proves very effective in educating appetites in these children. In older children an explanation of the importance of food to growth may aid in overcoming anorexia. Boys always have some athlete whom they admire and hope to emulate. The girls all want to become beautiful. With this in mind, one can convince these children that food does help them in attaining their goal.

Proper nutrition has a definite effect upon the mental development of the child. The mentally normal child is usually very easy to handle, as he responds to the dentist's efforts in the proper frame of mind. Picture the malnourished child, on the other hand, as he presents himself in the dental office. He comes in sulking, stubborn, and refusing to respond to any stimuli of a pleasant nature. In school he is behind his class, physically he is subnormal. While the responsibility of the child's school progress and physical condition does not rest primarily with us, as dentists, these conditions will be automatically benefited as his mouth conditions improve.

In summary, if we were assured of a proper prenatal diet, postnatal diet, preschool and school diet, with periodic and systematic medical and dental care, dental caries would be eliminated along with the other diseases of lowered resistance. With a glow of accomplishment we shall see these children grow to womanhood and manhood, knowing that we were instrumental in their physical attainments. In the field of dentistry for children there is a challenge of high idealism and a hope of real service.

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YOUR PATIENT

E. Melville Quinby, M.R.C.S., L.R.C.P., D.M.D., Boston, Mass.

Blessed are they who were not satisfied
To let well enough alone;
All the progress the world has made
We owe to them.*

WE COME now to a consideration of "your patient" between sixteen and twenty-five years old, and we should remember that this age is a most important one, the transition between childhood and maturity, during which mental, moral, and physical characteristics are prone to develop by leaps and bounds—though retarded in some cases. This also is the period which, from the health point of view, is the most difficult for health workers, educationists, and parents to deal with efficiently.

It is said that health depends on heredity, and on the sum total of physical and mental leanings of the individual, and on environment. "These factors should be so fitted in and adapted to one another that what is weak or unprovided for in the first, will be amply compensated for in the second."

So when "your patient" appears, the first duty of the general practitioner in dental health service is to form a rough estimate of the mental and physical characteristics of that individual. The age, height, weight, the facial complexion, the eyes, nose, ears, shape of head, hair, hands, feet, posture, all have a tale to tell and are hints of value for consideration by the up-to-date dentist or physician; a history of the patient's likes or dislikes for people, games, scholarship, and the hundred and one things of daily life and activity are all of value in forming a diagnosis, prognosis, and outline of treatment.

All of which tends to emphasize the importance of the statement previously quoted that "Parts must not be examined before the whole has been surveyed."

In case there is any doubt about the significance of this preliminary survey, let it be understood that some idea of the nutrition or metabolism of the individual is the main object thereof.

But what is meant by nutrition? This question may be answered by a quotation from Logan Clendening's book, *The Human Body:* "After the foodstuffs have been converted by the digestive juices, after the results have been absorbed by the blood and lymph, after the blood has absorbed also oxygen, and been driven by the heart through all the arteries of the body, then the resulting materials are used in the production of Energy, the production of Heat; and the reproduction of broken-down cells; and the whole crucial process is described as *Nutrition* or *Metabolism.*"

Metabolism is one of the many words constantly in use the meaning of which is taken for granted or left to the imagination.

*North Carolina Dental Bulletin.

To return once more to the consideration of "your patient"—incidentally, it must appear to the reader that the point of this story is still very much *in nubibus,* and so it is—for a very good reason, viz., that for any one old enough to have acquired sufficient experience to formulate any worth-while philosophy of life, or living, or working, it is difficult to explain just why it is better to do this thing or that thing!

Take medicine for example, many of us can remember the family doctor of old, a man who by his presence in the house or at the bedside promoted a sense of well-being and confidence for all concerned. This same doctor might have little paraphernalia of office with him, with the exception of a clinical thermometer and a wooden stethoscope, carried for the sake of convenience in his tall hat; but his mind was packed with clinical knowledge, born of much bedside study; the "tactus eruditus" was highly developed; and what he could not feel, he was able to see or hear. Most of the laboratory tests, so essential to a modern diagnosis, were conspicuous for their absence in those times! But now, alas, we see all too little of the old style family doctor, who was more inclined to envelop the community with a mantle of good deeds than to foster selfish interests. He was a public benefactor if there ever was one.

All of this is by way of pointing out the difficulties in the path of a would-be teacher or guide. It is comparatively simple to lay down didactic rules—"do this" and "don't do that"—which mean very little to the average neophyte, and perhaps less to the old practitioner who is rooted and grounded in practices common to his particular school of thought and training.

The sum total of experience to be of any abiding value must represent the mental evolution of the individual who is attempting to lead the way to an understanding of some special hypothesis, and the simplest way possible is to outline my own professional story from 0, representing the commencement of my professional life, to X, which signifies my present method of dealing with dental problems.

Looking backward then to 1893, the year of my graduation from dental school, I found myself installed as assistant in the family dental practice—a very large one, with patients from a wide area of influence.*

In any practice, however well established, there is always a period of waiting before any patients are available for the newcomer. Dentistry as a successful pursuit depends largely upon the personality of the operator; and patients most decidedly have their preferences for the one practitioner who has gained their confidence, either from a feeling of complete security respecting unnecessary pain at his hands, or from regard for the skill, etc., of that particular operator; or again, from having acquired the habit from childhood of going to the same dental office. In any case it is always a delicate matter to entrust an old patient to a new hand, even if the latter happens to be a relative of the senior operator.

What then are the sensations of the new dental assistant on having a scion of some important family delegated to his care for the first time?

Are we to assume that the recent graduate is so sure of himself and his technic that he has no qualms about tackling this new patient? Oh no, this is

*Liverpool, England.

a much more difficult situation than that to which he has been accustomed in the dental school clinic! In the latter environment, with patients taken indiscriminately from a group of unknowns, who need dental service, the student, with a large staff of instructors at his back, can easily acquire a species of confidence in results, for he has little personal responsibility! But in the private office when one is introduced to the first or to the many subsequent victims, there is likely to be a sensation of stage fright or a nervous feeling of helplessness, when control of all those mechanical skills acquired in the years at school seems to fade unaccountably into thin air!

The introduction over, and the patient seated in the chair, then comes perhaps the statement from the patient that he has had an indefinite toothache! Next ensues the search for a cavity with mirror and explorer, with perhaps at first no result!

By this time the operator is conscious of a fine perspiration oozing out on his forehead, with a growing suspicion that the patient is already experiencing grave doubts as to the ability of this new dentist to find anything, or to do anything worth while!

And then, O joy, the explorer catches in a small cavity situated, perhaps, between the right maxillary first and second permanent molars. (Remember there were no bite wing films in those days!)

Looking for cavities and filling them with gold was the common occurrence in patients over sixteen years of age. Younger teeth were many times filled with hard gutta-percha; and although the external surface of such fillings was not very prepossessing in appearance, the internal surfaces of the cavities of teeth so treated showed remarkably little change after ten or twelve years' duty. Incidentally, it may be mentioned also that gutta-percha was frequently used in those days for impressions of mouths in which regulating measures, especially the Coffin plate technic, were to be used, and it took very sharp impressions; but, being very elastic in nature, it had to be handled with care. Also in those days, the workroom was a most important adjunct to such a practice. There were always three or four men and apprentices at work from 9 A.M. until 5 P.M. *En passant,* the man who still presides over the said workroom has been there for about sixty years and is still going strong! The prosthetic work turned out was a model of esthetic efficiency; roughly speaking about 95 per cent of all cases, vulcanite or gold, were successful the first time; and what is more, no cases were ever tried in. Please let that fact sink in! Gold crowns were made, of course, two piece as a rule; and for anterior teeth, porcelain pivot teeth were used and were very successful in point of years of service. Later came the era of porcelain inlays and gold inlays, all of which were made on the premises—and it may be said, that we knew then or thought we did a lot more about inlays than we do now!

The picture of the workroom divided into the front and back room would not be complete without a description of the latter, the Sanctum sanctorum! This room had, as did the other, an east window and also a skylight, and under the skylight (north) was placed the pet lathe, everything in first class running order, including perfect stones for grinding. For here, apart from all distracting influences, were created the dentures with gum sets, which had joints care-

fully ground to fit—no V-shaped joints there! And for selection of teeth, there was a cabinet with drawers containing eighty to one hundred thousand teeth. The last but not least object of note in the back room was a furnace about three feet six inches in height, where the continuous gum cases of bygone days were cooked over a coke fire; and the operator had to don smoked glasses to inspect the cases from time to time because the heat was so great.

Another major part of a practice in the days of yore was extraction, or exodontia. Nearly every day in the week was commenced by the senior operators with a chloroform case; and the anesthetist was invariably a graduate of Edinburgh University and pupil of Simpson, who was the great authority on chloroform. Under such circumstances there never was any contretemps, but chloroform in other hands was a very dubious proposition. Of course nitrous oxide gas was used (pure) and in our experience was a most satisfactory anesthetic for extracting a few teeth. No case of nausea was ever known, and no precautions about eating beforehand were taken. In chloroform cases, however, such precautions were taken.

In my opinion anesthesia is a major study of medicine; and no one should be allowed to administer an anesthetic, as a rule, who has not had medical training! As I remember, this has been the almost universal practice in England from time immemorial.

In this environment, as a boy playing round in the workroom, but absorbing some facts unconsciously, and as man in practice, many years were spent; and many a time when the day's work was done, one experienced a glow of satisfaction at having accomplished a good filling or two, or at having placed a part gold upper with a click, or at having carried out successfully a difficult extraction.

During this period, however, experience was being acquired; it takes at least ten years of practice for any one, even the most brilliant graduate of any school, to rearrange mentally and technically the innumerable details of practice acquired under the supervision of a large number of teachers, many of them at variance, into a workable individual technic. Even so, it must be remembered that nothing is static, that because a thing was done in such a manner once is no reason why it should not be done in a different and better way, and probably should be!

With this preamble, we are in a position to take up the question of our sixteen- to twenty-five-year-old patients; and the advice to be given represents the experience of the last twenty years after my return to the United States and being introduced to some of the apostles of oral hygiene, notably T. P. Hyatt of New York. So that "adventures in oral hygiene" might be a subtitle for this article.

Before giving any instructions let me repeat that the underlying principle of this work is to encourage and stimulate the general practitioner, who, not the specialist, is responsible for the dental salvation of the community. General practice, as its name implies, includes all the measures incidental to the building and upkeep of the dental machine, and the latter term embraces not only teeth but also supporting tissues; and oral hygiene includes the health or disease of

the other tissues which make up the oral cavity. To successfully carry out this duty implies that the capable operator must be entirely different in caliber from the dentist of the type who has looked upon a row of teeth in the light of "wooden pegs on which can be hung all kinds of dental jewelry."

Adventures in oral hygiene, speaking frankly, were undertaken by me mainly with the idea of trying something new. There was no hint or suggestion present in my mind at that time that oral hygiene was a health measure.

The results of my research during the past twenty years have been described in many forms, beginning with the publication of "What Can Be Done for the Dental or Oral Machine," ten years ago. Now the chart idea has appeared in language simple enough for a child to grasp the meanings.*

With regard to the type of education necessary to equip a practitioner for dealing adequately with the dental problems of today I feel that a training in the classics between six and sixteen years or longer, a much more extensive acquaintance with medicine for the dental student, and at any rate a nodding acquaintance with oral conditions for the medical student with a thorough revision of the emphasis on certain lines of thought hitherto stressed in the dental curriculum are required. For details of this idea see the early parts of this series.*

For any one who has the patience to read this article understandingly, it may happen that he or she will begin to realize the significance of such a thorough training and realize more clearly also, as I do, what Dr. Owre had in mind when he stated that one well-trained dental physician would be in a position to supervise a group of less highly trained operators.

It may be noticed that the word "education" is not used herein so much as "training," for the reason that education is a lifelong process of acquiring new ideas and new settings for older notions. The idea of any one's being able to attend some course or other for a definite length of time, and then after "getting by" the exam to emerge with an education on a platter, so to speak, is too silly for words.

In examining mouths of individuals over sixteen years of age, two principles should ever be present in the mind of the examiner or diagnostician, viz.: (1) parts should not be examined before the whole has been surveyed; (2) a recognition of a mixed etiology in mouth health and mouth disease.

These two principles must never be forgotten if we as a profession expect to emerge from the rut of traditional routine and restricted practices.

It is time now to contrast modern methods and ideals in dental practice with those of which I have been writing. Whereas under the old regime there may have been every excuse for a restricted practice of health measures, because there did not seem to be any health connection with dental work; at the present time with all the facilities of hospital and laboratory research in the background, there is no valid reason why a complete and systematic examination of the oral cavity and parts associated cannot be made. To accomplish this is the duty of every general practitioner; however, it entails a complete change of mind with regard to the scope of dentistry, a new vision must be cultivated.

*Internat. J. Ortho. 21: 56, January, 1935.

Between sixteen and twenty-five years (or later) the patient, male or female, should be tested roughly on the points of:

1. Building, or nutrition,
2. Fitting of parts, or occlusion,
3. Cleaning of parts, or hygiene of the dental mechanism.

This survey does not focus on teeth alone; the first lesson then for the general practitioner is to include the supporting tissues equally with the teeth.[1]

I remember visiting some few years ago the clinic of a large institution devoted to children's dentistry. On arrival I was met by the supervisor, who pointed with great delight to the chairs reserved for the dental hygienist class all occupied by patients—incidentally the class had not at that time learned how to use their instruments properly on the manikin. This was to be their first experience on the living subject! The patients were all about sixteen years of age, of both sexes, in the secondary school, and had visited the clinic to have their teeth "scrubbed"! A cursory examination soon convinced me that hardly one of those patients was a fit subject for a set of greenhorns to deal with; that many of them required very careful handling and treatment, based on knowledge of the many factors concerned in the etiology of gingivitis. To repeat, there was not a single case suited for the type of "scrubbing" to be expected under the circumstances, through ignorance of the various types of gingivitis and their significance.

For the complete and satisfactory handling of any patient over sixteen years of age it should be understood by every general practitioner that:

First, there should be a conference with the patient on general principles.

Second, an all inclusive diagnosis, not a superficial one, must be made in each case, if only as routine, but never omitted.

Third, an outline of treatment must be charted.

1. Conference—the object is to establish a real background for treatment.

(a) To instruct the patient as to the principles of a mouth condition which is a part of a general systemic diathesis.

(b) In other words, to make it quite plain that mouth health is part of a general health measure, and that the practitioner is acting as a dental physician.

(c) To show further that such a practice entails the gathering of data such as in medical practice would make a diagnosis possible for the physician.

(d) To explain in detail why such data as radiograms, transillumination tests, vitality tests, family history, personal history, physical examination, etc., are necessary for a real diagnosis, prognosis, and an outline of treatment.

To prepare for diagnosis, make a radiographic survey of the entire dental machine, including bite-wing films for intensive interproximal study. Next, take impressions of the dental machine, with check-bites, and mount them on the best articulator available.

In many cases smears should be taken for bacteriologic survey, and arrangements may be made with a physician for a complete physical examination. The patient should also have a dietary chart to fill out, the report covering one week at least.

2. Diagnosis—in detail:

   (a) Radiographic survey for (1) dental caries, (2) apical condition, (3) parietal condition. (*see* "Supporting tissues.")
   (b) Transillumination tests.
   (c) Vitality tests.
   (d) Study models—to check up occlusion, contact points, etc.
   (e) Mobility of teeth: (1) movable, (2) loose, (3) wabbly.
   (f) Clinical study: (1) by vision, (2) by palpation, (3) by explorers.
   (g) Supporting tissues: (1) history and nature of present complaint, (2) family history, (3) personal history, (4) physical examination of tonsils, sinuses, kidneys, heart, alimentary canal, pelvic organs. Blood (pressure, count, chemistry).

Armed with the preceding data the dental physician is in a position to present an outline of conditions to the patient with a view to formulating a scientific treatment based on real etiology—a treatment which is not empirical.

The diagnostic findings should be discussed with the patient, and the simple but forceful analogy of the dental machine with any other mechanism should be carefully explained, viz.:

1. The parts must be solidly built.
2. The teeth must be in alignment for a smooth working machine.
3. The machine must be cleaned exactly the same as any other machine.

It should be insisted upon that these three factors be considered in every case, or the result in treatment will be unsatisfactory because restricted. This idea of one factor in health or disease must be abolished in justice to the public.

A systematic diagnosis should be carried out, but if the method described seems out of place or inadvisable—as in many cases it will—there are points of attack on the problem which can be used in every case.

As I write this, I have a photograph of a real dental machine before me, one of Dr. Hirschfeld's; and it is obvious that in examining this mouth the gums or supporting tissues should hold equal importance with the dental units as a factor in function and health.

The first rule is to establish the fifty-fifty status of teeth and gums, commencing with the latter to demonstrate the "mouth complexion," for as there is a facial complexion which is a guide to health of the individual so there is undoubtedly a color scheme of the mucous membrane of the oral cavity which is indicative of health or disease. Mouth complexions, however, vary in color, etc., so that to prevent mistakes the operator takes the patient's lower lip, between the first finger and the thumb of each hand, and everts the lip, until a clear view of the lower jaw is possible. Then the color of the mucous membrane of the

lower lip is compared with that of the marginal and alveolar gingivae. Any change in contour or color of the gingivae betokens some abnormal condition. Next, the upper lip is everted and a similar observation made. Then a test of mobility of the mandibular incisor teeth is made by using a pair of blunt-nosed pliers engaged with the incisive edges of the teeth, and with the forefinger of the left hand supporting the teeth (cervically) an attempt is made to move any one of the four incisors.

Incidentally it may be said that many instances of deviation from mouth complexion, contour of gingivae, and mobility of teeth occur as early as eight to ten years of age, and constitute some of the early changes in the periodontium, which, if unchecked, ultimately lead to an incurable condition of pyorrhea alveolaris; and yet I will guarantee that not more than 5 per cent of the patients who visit the dental office have experienced the simple tests just described. (It took at least twenty-five years of practice before I saw my duty in this respect!)

This survey must be made if we as a profession are to have any chance of preventing destruction of the periodontium.

Suppose we consider for a while the appearance of a normal dental machine such as I have in front of me as I write.

Before picturing the normal, however, I wish to quote the late Dr. Stevenson of New York on the subject of the usual mouth conditions: "The average mouth presenting for treatment to the oral surgeon or orthodontist—to say nothing of general practitioners—is usually unfit for ministrations. Incrustations of salivary calculus containing decomposing food bodies of dead bacteria as well as living organisms in active proliferation are present. To operate in such a mouth is to violate the laws of asepsis; (remember the Institution case cited), and even a cavity preparation or an impression taken under these conditions, indicates a disregard for the health of the patient."

In conjuring up a mental picture of a normal healthy gingiva, or gum, I see the free margin of the gingiva thin and apparently bloodless, hugging the neck of the tooth, with the interdental papilla reaching well up to the points of contact of the teeth. As mentioned, the color varies from light pink to a deeper red; and in health it has a fine stippling, or alternate spots of lighter and darker shade. Box says that when the gingiva is dried it presents a velvety appearance, due to normal circulation in the capillary loops.

Between the marginal gingiva and the tooth is a much discussed area called the gingival crevice or trough; and as it is still in a transitional state actually and metaphorically I shall not say much about it.

The main portion of gingiva (alveolar) or gum extends down (mandibular) for about 5 or 6 mm. where the tissue changes in texture, and is called the "areolar mucosa." In this survey our attention is confined to the marginal and alveolar gingiva. Frequently a crescent shaped zone of abnormally deep color confined to a zone of the marginal gingiva, for about one-sixth of its extent, is noticed. The cause is a combination of disturbance of function and unhygienic conditions.

Sometimes the whole area of the marginal gingiva is congested, probably as a result of constitutional and local causes.

Then there are to be seen the festoons described by McCall; there is a uniform festoonlike thickening of the marginal gingiva which does not involve the free margin—a very characteristic picture. It is probably concerned with traumatic occlusion and lessened power of resistance (nutritional).

Another symptom of gingival abnormality is that known as recession of the gum. Box describes this condition:

"Taking the amelo-cemental junction as a fixed landmark, it is often noted that the marginal gingiva has an altered relationship with this line. In the average—the amelo-cemental line is 2 mm. below the free margin of the gingiva. Recession of the marginal gingiva toward this line is indicative of alveolar crest absorption." (N. B. This absorption is one of the early symptoms most disregarded.) But "exposure of the amelo-cemental line represents a crest absorption of 2 mm."

In ordinary everyday practice we see congested marginal gingivae of varied shades of color from pale to dark red, or lean ham shade, as the result of a lack of hygiene, lack of the right kind of diet, also from irritation of overhanging fillings and crowns and of faulty dentures. In both children and adults calcareous deposits are rife and cause much trouble. In Hartzell's works, the results of such deposits—bacteria laden—are pictured: "Pyorrhea can exist only as the result of the activity of streptococci and staphylococci which gain access to the tissues by digesting the epithelium lining the gingival crevice."

In looking for deviations from the normal "mouth complexion" we are confronted with a wide range of pathologic conditions, but the scope of this article will permit only a glance of recognition. Some of the most common at this age are Vincent's infection, acute, subacute, and chronic; gingivitis from want of cleaning; scorbutic gingivitis; gingivitis from pregnancy and from defective nutrition; purpura; syphilitic eruptions, as mucous patches; tuberculous ulceration; herpetic ulceration; aphthous ulceration; anemia; leucemia; fuso-spirochetal disease; newgrowths, as epulis, generally benign, but occasionally malignant in character, usually sarcoma, but carcinoma is met with even at this age.

Dr. James Ewing of the Educational Bureau of the American Dental Association has made the following important statement: "Cancer of the mouth and tongue is a common and very often fatal disease. In the year 1922 there were 3,249 deaths from this cause in the United States, nearly all of which could have been prevented if the victims had possessed a moderate amount of easily obtained knowledge as to the causes and early signs of this disease. Cancers occur on the lip, the tongue, cheeks, gums, floor of the mouth, and tonsils, and in each situation they differ somewhat in origin and appearance. While these and other forms of cancer usually occur in persons over forty years of age, it is a highly important fact that cancer occurs not infrequently in persons between the ages of twenty and thirty years." I regret that it is impossible to give further details except the following: "Since buccal uncleanliness is the main exciting cause of cancer of the mouth . . . it is of the utmost importance that every one should know how to keep the mouth clean."

We come next to the very important symptoms of mobility, a condition which should be looked for from eight to ten years onward through life. Box says:

"*Mobility No. 1, or Movable.*

"A degree of mobility. So slight as to escape casual observance. Requires careful manipulation and, in many cases, some considerable digital pressure for its detection. In this disease some portion of pericemental fibers are replaced by soft yielding tissue.

"*Mobility No. 2, or Loose.*

"When the inner plate in tooth-socket, so-called lamina dura, is destroyed to any extent, increased mobility, beyond that designated as No. 1, or Movable, is noticed. The teeth become loose."

In considering the various conditions of the periodontium or the supporting tissues of the teeth, remember that such conditions whether of health or of disease depend upon the fundamental principles of general physiology and general pathology.[2]

Next in order comes a study of the models of the dental machine to demonstrate occlusion and possibilities of function. The alignment of parts of the American dental machine is estimated to be abnormal or out of gear approximately 90 per cent.

This is a serious situation and in the view of a well-known anthropologist (Hooton[3]) constitutes a menace in the satisfactory evolution of *Homo sapiens.*[3]

"That there is a definite plan in nature to develop to perfection, there can be no doubt. Every natural process has a definite plan that is beautiful if not interfered with. . . . In fact this great natural law of balance is universal. . . . In all nature we find that if there is a lack of conformity to the ideal the thing loses beauty and becomes ugly. The ideal or beautiful is attained by function developing well-balanced geometric proportions. If function is interfered with, it must follow that development to the ideal will be interfered with, and there will be a consequent loss of balance and beauty. . . . It is exceedingly odd that while we all recognize the masticating apparatus in its normal state as such a beautiful and well-balanced machine that we should not consider it as a whole when operating upon it and cease to do piecemeal work." (Smith.[4])

If, however, the general practitioner will take the steps outlined which are necessary to check up on the early conditions of each dental machine from an early age, steps may be formulated which can to a large extent overcome this national deformity. In other words, measures could be adopted which would do the maximum good for the majority of our citizens. Under existing policies, only a fraction of the 25 per cent of the citizens of United States who have any knowledge of or benefit from dental health measures can afford the treatment which the ultraconservative orthodontist of the present day persists in advocating. The solution of this problem is in the hands of the general practitioner.

The captious critic will ejaculate at this time that nothing has been said about repair work. I feel that there is no necessity for me to expatiate on that angle of the problem, in the face of the oceans of literature on the subject.

There is, however, another factor which has been very much misunderstood, and treatment taken altogether too much for granted in the past. I refer to the upkeep of the dental machine, and more especially the cleaning or hygienic measures.

In an earlier section of these articles* reasons have been given why teeth should be cleaned and gums massaged.

In the first place, I wish to emphasize the fact—in the strongest manner possible—that in the large majority of cases the technic of tooth cleansing, tongue cleansing, and gum massage is woefully defective. Brushing of teeth is one of the daily duties which is taken for granted, and yet in my experience most people on being invited to demonstrate their usual method of toothbrushing disclose a lamentable ignorance of the principles involved. This lack of knowledge includes: (1) the kind of brush to use, as to size, arrangement and texture of the bristles; (2) the method of using the brush; (3) the times when the duty should be carried out usefully; (4) tongue cleansing; and (5) the why's and how's of gum massage—all are more or less foggy in conception and execution.

Every dentist should make a point of educating each patient about these details; and yet I could count on the fingers of one hand all those patients who have demonstrated to me, when invited to do so, a convincing method of attack resulting from previous teaching by other practitioners. I may be unfortunate in my selection of cases for inquiry, but that has been my experience.

It is difficult for me to grasp the reasons for this indifference, or disbelief, or ignorance on the part of so many people. It may be due to the well-known inability of the mass to see more than one thing at a time. For a considerable period in the early part of this century, the slogan "A clean tooth never decays" had a vogue and undoubtedly did a lot of good. Then the proponents of the new nutrition came along with a very convincing program, with the result that the old friend "cleaning" had to take a back seat. It was all nutrition; whereas all that was needed for success, was an amalgamation of diet *and* cleaning, not one without the other. I am speaking, of course, for American citizens, and not discussing Italians, Maories, Eskimos, or Swiss dwellers in isolated valleys at the foot of the Alps.

This is not the place to go into details as to the kinds of brushes to use, or the methods of using them—Drs. Chartres and Stillman and others have written extensively and taught in person all over the country.

With regard to gum massage, however, I am convinced that this operation is carried out in an altogether too perfunctory manner for the reason that the blood conditions of the patient in general, and of the periodontium in particular are not studied sufficiently.

In most cases, gum massage, equilibrating muscular function, and vigorous chewing are helpful.

"Gum massage must be done in the direction in which venous blood is returned to the heart so that the arterial supply which comes from beneath may

*Internat. J. Ortho. 21: 56, January, 1935.

freely bring resistant and rebuilding properties to diseased tissue." (Sarrazin.[5])

An unhygienic condition of the mouth is probably a source of infection for the tonsils by "contiguity and moisture globules," and an oral clean-up is doubtless of much benefit in many cases of tonsillitis.

So please study brushes, or any other cleanser preferred, methods of using them, and also massage methods, and do not become obsessed by the idea so glibly expressed over the air that such and such a dentifrice, paste, powder, or mouth wash is necessary to existence—or to mouth health. In the last analysis plain salt and water, and a good soap (castile) will work wonders. But the mouth must be kept clean!

The following is a summary of the methods of value in this survey:

Essential steps in diagnosis, prognosis, and treatment of odontial and periodontial conditions.

1. Chart the teeth { movable / loose / wobbly } (traumatic occlusion) fillings and crowns.
2. Radiograph the teeth { movable / loose / wobbly } and those with large fillings and crowns or cavities.
3. Study the radiographs with the chart.
4. Study the models.
5. Heavy scaling and home cooperation.
6. Systemic study—to influence diagnosis.
7. Clinical study at chair with (radiographs and vitality tests).
8. Extractions of diseased teeth.
9. Chair odontexesis and massage.
10. Correct traumatic occlusion.
11. Remove faulty crowns and fillings.
12. Probe pus pockets.
13. Arrange for scientific prosthesis, or orthodontia if necessary.
14. Curette roots and give treatment.
15. Repeat chair odontexesis and give instruction for home care; also give hints as to diet.

It is easy to voice displeasure with existing conditions, and difficult to present a remedy in an acceptable way. But in common with all branches of human endeavor in the present crisis, we as dentists will be compelled to readjust our point of view, or method of attack, of the dental problem, not only in the interests of the community but also for the economic benefit of the dental practitioner.

The underlying motif of my scheme of practice may be described as a central truth, and when you discover such a truth, you have found something which governs numberless facts: "This discovery of a truth is pure joy to a man—it is a liberation of his mind. For a mere fact is like a blind lane, it leads only to itself—it has no beyond. But a truth opens up a whole horizon, it leads us to the infinite." (Tagore in *Sadhana.*)

In order to carry out this mental orientation to a profitable conclusion, we must accent the doctrine of the sage who insists that in the solution of any problem we must enter the field of readjustment entirely free from

> "Foregone conclusions,
> Arbitrary predetermination,
> Obstinacy and egoism."
>
> (Confucius.)

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THE WIDTH, THE ENAMEL SURFACE AREA, AND THE VOLUME OF THE CROWN OF THE DECIDUOUS AND THE PERMANENT TEETH*

JOSEPH T. COHEN, D.D.S.,† MINNEAPOLIS, MINN.

THE differences in the comparative sizes of the deciduous and permanent teeth were estimated by the following procedures. Impressions were taken of the mouth of a man twenty-six years of age with thirty-two teeth in good condition, and plaster casts were made. The same was done for the mouths of two five-year-old boys with normal dentition (Fig. 1). From these casts determina-

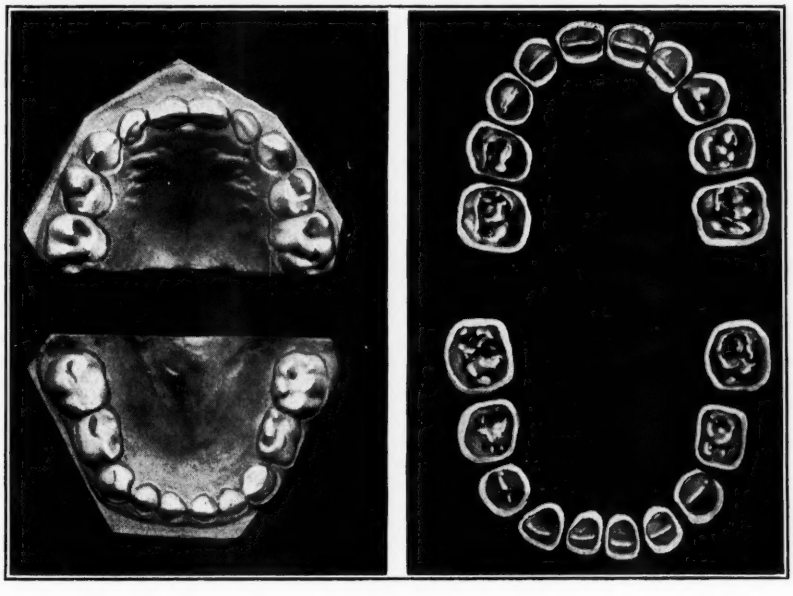

Fig. 1.

tions were made of the width, the area of the enamel surface, and the volume of the exposed portion of the individual teeth. Although the deciduous and permanent teeth studied were not of the same individual, a comparative study of the three sets is of interest.

The teeth of the plaster casts were separated, and the width (the greatest mesiodistal distance beginning at the midline) was measured for each tooth. The results are given in Table I. It is to be noticed that there is but little difference between the maxillary and the mandibular teeth of each mouth and even less difference between those of the right and left sides.

*This study was carried out at the suggestion of Dr. Richard E. Scammon of the Department of Anatomy, University of Minnesota.

†Institute of Child Welfare, University of Minnesota.

TABLE I

WIDTH, ENAMEL SURFACE AREA, AND VOLUME OF EXPOSED PORTION OF TEETH

	WIDTH IN MILLIMETERS			SURFACE IN SQUARE MILLIMETERS			VOLUME IN CUBIC MILLIMETERS		
	PERMANENT	DECIDUOUS CASE 1	DECIDUOUS CASE 2	PERMANENT	DECIDUOUS CASE 1	DECIDUOUS CASE 2	PERMANENT	DECIDUOUS CASE 1	DECIDUOUS CASE 2
Right Maxillary Teeth									
Central incisor	8.1	6.7	6.6	160	57	45	156	47	48
Lateral incisor	6.0	5.4	5.5	113	47	38	114	27	40
Cuspid	6.9	7.0	7.4	138	73	52	129	57	81
First bicuspid	6.9	7.3	8.1	148	102	85	142	114	135
Second bicuspid	6.8	9.4	10.0	178	139	118	210	176	220
First molar	9.6	---	---	253	---	---	358	---	---
Second molar	8.9	---	---	224	---	---	306	---	---
Third molar	8.9	---	---	121	---	---	208	---	---
Left Maxillary Teeth									
Central incisor	8.1	6.9	6.9	189	65	55	193	58	62
Lateral incisor	6.2	6.0	5.2	109	49	40	89	32	44
Cuspid	6.3	6.8	6.6	117	72	58	111	76	77
First bicuspid	7.0	7.2	8.2	151	114	99	176	118	129
Second bicuspid	7.0	9.0	9.6	167	166	128	194	216	250
First molar	9.7	---	---	247	---	---	363	---	---
Second molar	8.9	---	---	245	---	---	349	---	---
Third molar	8.9	---	---	158	---	---	212	---	---
Right Mandibular Teeth									
Central incisor	4.6	4.6	4.8	133	43	41	82	27	33
Lateral incisor	6.3	4.6	5.5	124	50	48	99	38	37
Cuspid	6.1	6.4	6.5	147	55	61	124	74	76
First bicuspid	6.6	8.2	8.0	140	86	88	154	124	142
Second bicuspid	7.3	10.4	10.3	187	129	140	225	247	217
First molar	9.6	---	---	263	---	---	364	---	---
Second molar	10.7	---	---	284	---	---	413	---	---
Third molar	9.6	---	---	174	---	---	213	---	---
Left Mandibular Teeth									
Central incisor	4.6	4.3	4.7	124	43	46	76	29	33
Lateral incisor	5.4	4.8	4.9	127	46	50	90	35	34
Cuspid	6.1	6.5	6.3	126	76	57	138	70	77
First bicuspid	7.0	8.0	8.0	112	112	87	136	129	148
Second bicuspid	7.1	10.3	10.4	137	154	136	201	214	197
First molar	9.9	---	---	224	---	---	371	---	---
Second molar	10.8	---	---	216	---	---	416	---	---
Third molar	9.9	---	---	151	---	---	206	---	---
Combined Measurements									
All teeth	245.8	139.8	143.5	5,387	1,678	1,472	6,618	1,908	2,080
Maxillary teeth	124.2	71.7	74.1	2,718	884	718	3,310	921	1,086
Mandibular teeth	121.6	68.1	69.4	2,669	794	754	3,308	987	994
Percentage difference between maxillary and mandibular	2.1%	5.2%	6.5%	1.8%	10.9%	4.8%	0.7%	6.9%	8.8%
Right teeth	122.9	70.0	72.7	2,787	781	716	3,297	931	1,029
Left teeth	122.9	69.8	70.8	2,600	897	756	3,321	977	1,051
Percentage difference between right and left	0 %	0.3%	2.6%	7.0%	13.9%	5.4%	0.7%	4.8%	2.1%

To measure the area of the enamel surface gold caps were burnished over each tooth down to the free gum margin (Fig. 1). Great care was necessary to eliminate any overlapping of the gold in order to have only one thickness covering each tooth. After experimenting with different materials of varying thickness, it was found that 24K gold plate 0.060 mm. thick was well suited to the purpose. The thickness of the material used was found by averaging fifty measurements taken with a Schoppfer's automatic micrometer at different points on each plate of gold. One ounce of gold plate of this thickness was found to contain 28,852.25 sq. mm. of area. As there are 480 grains in an ounce, one

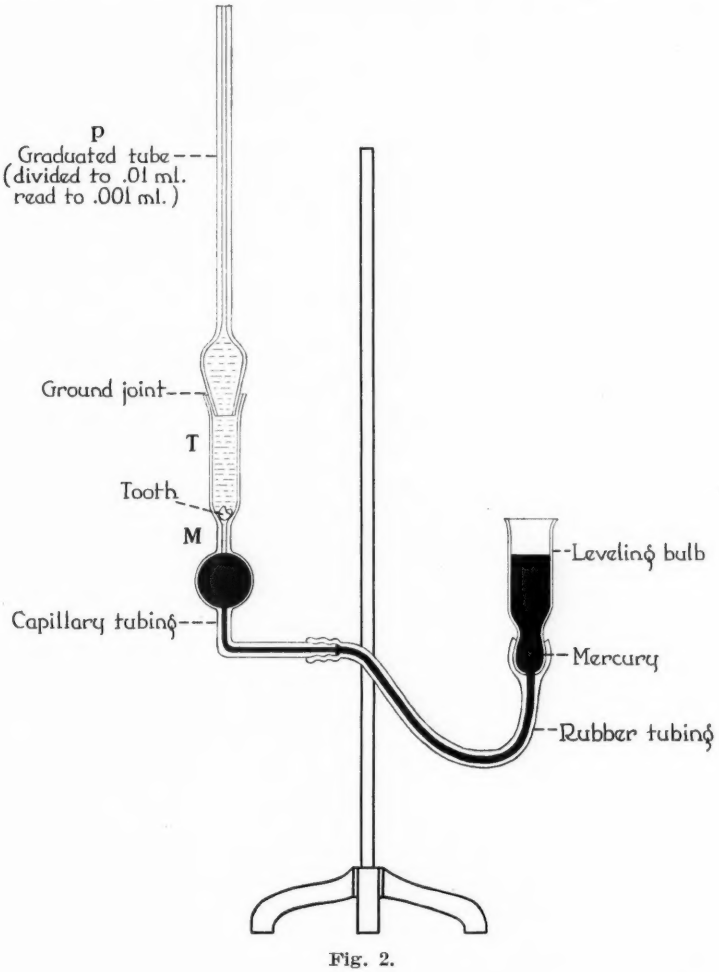

Fig. 2.

grain of gold plate 0.060 mm. thick contains 60.109 sq. mm. of area. Hence the exposed enamel area of each tooth can be obtained from the weight of the gold cap constructed for it.

The determinations of the volume of the crowns of most of the teeth were made with a typical pycnometer, but in certain cases the mouth of the pycnometer was too small and it was necessary to use a volumeter designed by Mr. Russell F. Heckman (Fig. 2). Clean, pure mercury was poured into the leveling bulb of the volumeter until it came to the mark *M*. Pure distilled water was then poured into the graduated tube *P*, the leveling bulb raised until

the level of the mercury was again at the mark *M*, and a reading taken of the water level in the tube. Next, the mercury was lowered until the water level was nearly at the bottom of the tube *T*, the tube *P* was taken out and the cast of a tooth dropped into the tube *T*. The measuring tube was then reinserted into the ground joint, the mercury raised to the mark again, and the level of the water read. The difference between the two readings gave the volume of the tooth directly in milliliters.

Fig. 3 represents the amount of enamel area of each tooth mapped out in the form of a square. The second set of deciduous teeth was used, as it was con-

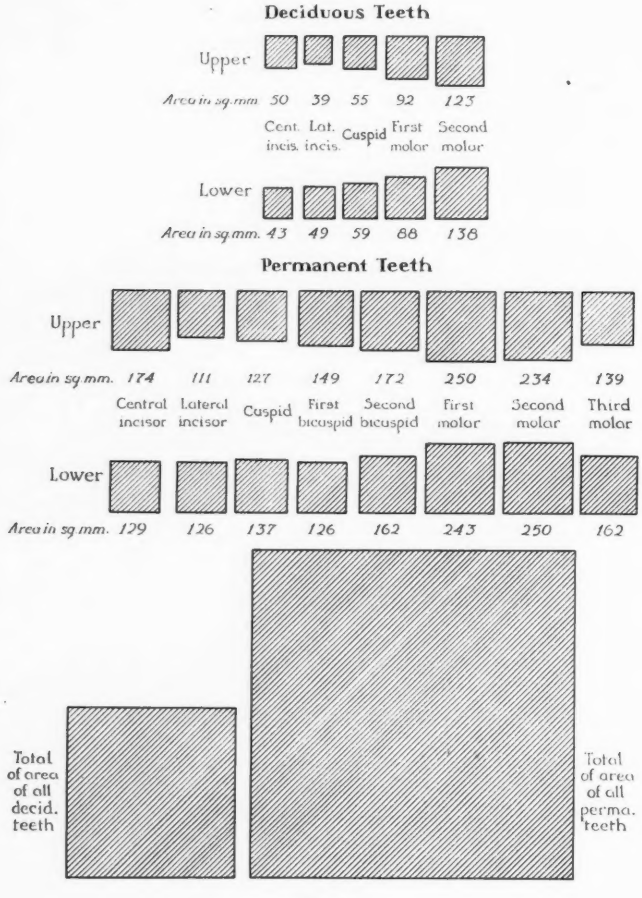

Fig. 3.

sidered the more typical. Since there was very little difference in size and appearance between the respective teeth on the right and left sides of the jaw, the mean of the two was taken and the figures were limited to the squares for only sixteen permanent teeth and ten deciduous teeth. The square root of the mean enamel surface area of each tooth was determined, and the squares were then constructed from these values. They show graphically the comparative amount of enamel area of the various teeth. The two larger squares represent combined areas, the smaller that of all twenty deciduous teeth, and the larger that of all thirty-two permanent teeth.

The volumes of the teeth are represented in Fig. 4. The cube roots of the volumes of the several teeth were extracted, and the cubes were then constructed. The large cube represents the combined volume of all the permanent teeth and the smaller cube that of all the deciduous teeth.

From Table I it will be noted that the permanent incisors are considerably wider than the deciduous incisors, but that the widths of the permanent cuspid and bicuspids are slightly less than those of the deciduous cuspid and molars. These findings indicate that the increased size of the permanent arch is due almost entirely to the presence of the permanent molars. The enamel area (5,387 sq. mm.) and the volume (6,618 c.mm.) of the complete set of permanent teeth were each more than three times as great as the mean enamel area (1,576

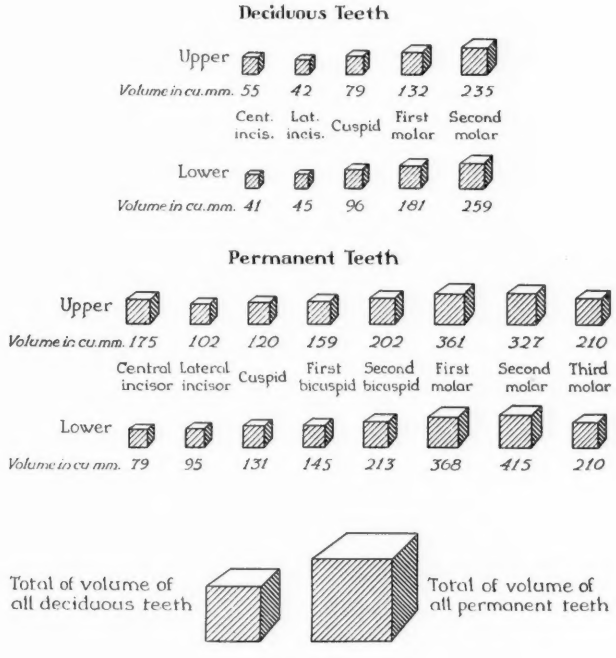
Deciduous Teeth
Upper
Volume in cu.mm. 55 42 79 132 235
Cent. incis. Lat. incis. Cuspid First molar Second molar
Lower
Volume in cu.mm. 41 45 96 181 259
Permanent Teeth
Upper
Volume in cu.mm. 175 102 120 159 202 361 327 210
Central incisor Lateral incisor Cuspid First bicuspid Second bicuspid First molar Second molar Third molar
Lower
Volume in cu.mm. 79 95 131 145 213 368 415 210
Total of volume of all deciduous teeth
Total of volume of all permanent teeth

Fig. 4.

sq. mm.) and the mean volume (1,994 c.mm.) of the complete sets of deciduous teeth. The twenty permanent teeth which replace the deciduous teeth have almost twice as much enamel area and volume as a complete set of deciduous teeth. This probably is not due to the fact that the permanent teeth are so much wider or broader than the deciduous teeth replaced, but rather, that the permanent teeth are considerably longer than their predecessors.

SUMMARY

1. Comparable teeth on the right and left sides of the median line on the same individual are approximately the same size.

2. The maxillary and mandibular teeth of an individual are almost the same size.

3. A full set of permanent teeth have about three times as much volume and exposed enamel area as a full set of deciduous teeth.

4. The permanent teeth which replace the deciduous teeth have about twice as much volume and exposed enamel area as do the deciduous teeth.

5. The width of the anterior deciduous teeth is less than the width of the succeeding permanent teeth, but the posterior deciduous teeth are wider than the succeeding permanent teeth.

TREATMENT AND RESTORATION OF FRACTURED PERMANENT INCISORS*

R. M. WAY, D.D.S., GALESBURG, ILL.

ONE of the many distressing situations which occur in a dental office is to have a child come in with a fractured permanent incisor. The problem is what to do and how to restore the lost contour with some type of restoration which will also appeal from the esthetic standpoint.

The many cases we see may be divided for means of discussion into three groups: first, fractured incisors with the pulp not exposed; second, fractured incisors with the pulp exposed and vital; third, fractured incisors with pulps exposed, nonvital, and fully developed apices.

For example, a patient at the age of nine years has the maxillary permanent incisor fractured. The incisal angle and incisal one-third are lost. The fractured surface is very sensitive to touch and to cold air. X-ray pictures are taken, and the rest of the tooth is found to be in a normal condition. It is necessary in such a case to place some protection over the fracture for a period of six months or a year, until the pulp begins to respond by depositing secondary dentin. This condition is taken care of by the following method:

The edges of the fracture are smoothed. With a dentimeter gauge the circumference is measured, and a band is constructed of 24K 36 gauge gold. The band is festooned, contoured, and allowed to extend just beneath the free margin of the gum, also to extend incisally, so that when completed it will be just out of occlusion. The lingual part of the band is cut to the desired length (slightly below the fracture), leaving the labial part extended. The lingual surface is burnished and contoured. This part of the extended labial surface is bent over and brought in contact with the lingual, and is soldered. The incisal edge is burnished to contour before soldering. The incisal edge is filled with solder for strength and the gold cap is then finished and polished. This cap can be completed in a short time in one appointment. The tooth is isolated and the band cemented to place with copper cement by first placing a layer of zinc oxide and eugenol over the fractured surface. It is important that the cap be short of occlusion. The tooth should be carefully watched, x-ray pictures taken periodically, and the vitality tested frequently.

Another method of restoring a tooth of this type is to place a three-quarter crown slightly modified, which has a minimum amount of tooth destruction in the preparation. If the fracture is not great and the pulp has some normal protection over it, or if the tooth has had a gold cap for some time, the following is suggested.

*Presented before the Knox County Dental Society, Dec. 17, 1934.

If the child is too young to have any permanent restoration made or to have any extensive preparation, the mesial and distal surfaces are paralleled with a sandpaper disc. Since it is necessary only to remove the contact, no more and no proximal grooves are made. The incisal edge is smoothed, thus completing the preparation.

A copper band is fitted and festooned, and an impression is taken with compound in the band. This impression is poured with inlay investment, allowing the investment to extend above the band. The model is separated and inlay investment is added to bring out the lost contour.

Kerr wax is adapted, 29 gauge over the lingual, incisal, and around the proximal surfaces and extending over the labial margin onto the labial surface. The wax can be easily adapted by first heating the model slightly and using art gum rubber to adapt the wax. This will give a more perfect adaptation. The wax is trimmed and cut to the contour of a three-quarter crown on the labial, and sealed to the model around the gingival, on the lingual and proximal surfaces of the tooth. The wax is smoothed and polished. Vaseline used on a pellet of cotton will give a high gloss to the wax. The sprue is attached on the incisal edge. The model is soaked in water, and the whole is invested for casting. Regular casting procedure is followed, allowing for expansion. The crown is cast and polished, and tried on the tooth. The margins on the labial surface should extend just over the marginal ridge onto the labial surface, so that a minimum amount of gold will show and at the same time offer enough for retention. The margins are trimmed down; however they will not be flush with the tooth surface. The crown is cemented to place using a light colored cement. When the cement is set, the part in the fractured area is cut out, leaving a thin layer of the cement around the inside of the crown, so that when the enamodent or synthetic porcelain is filled in it will not show a discolored filling. This makes a very neat restoration with a minimum amount of gold showing, and with little tooth destruction. This can be worn by the patient until time for a more permanent restoration.

In cases in which the pulp is involved and the patient arrives a short time after the accident, one of two things can be done: first, amputation of the bulbous portion of the pulp; or, second, removal of the entire pulp. The latter is done only in cases in which the pulp has died or the x-ray picture shows a completely developed apex. In all other cases a pulp amputation may be done. The tooth will remain vital, and proper normal development of the end of the root will continue. Later a permanent restoration can be placed on a vital tooth.

After obtaining an x-ray picture, and being sure that the apical end of the tooth is open and the tooth is vital, the procedure for the pulp amputation is as follows: Isolate the tooth with a rubber dam and use pressure anesthesia. To get the best results, a copper band is fitted tightly around the tooth extending above the fracture. A pellet of cotton saturated in phenolated water and then placed in the powder of a crushed E novocaine tablet is placed into the band on the exposure. With a strip of unvulcanized rubber, pressure is applied by packing it into the band, thus forcing the solution into the pulp tissue. The patient should be previously informed that pain will be noted for a second. Test the

pulp with an explorer, and be certain of the anesthesia; take a round bur slightly smaller than the pulp chamber, and remove about 3 mm. of pulp tissue. After the chamber is cleaned of all débris, it is ready to be filled. If hemorrhage occurs, place a small pellet of cotton saturated with formocresol or phenol compound in the pulp canal for one minute. The chamber is filled with a thick mix of zinc oxide and eugenol. The zinc oxide must be chemically pure. When packing into the pulp chamber, be careful not to trap any air under the zinc oxide. The pulp end must also be free of blood clot. With the zinc oxide as a base, the cavity is sealed with enamodent or cement.

The tooth should be carefully watched and x-ray pictures taken every six months; also the vitality should be tested frequently. If everything goes along all right for six months or a year, then a restoration similar to the one described could be placed. Secondary dentin is slowly deposited in the canal, and when the patient is older a more permanent restoration can be made. The tooth will still remain vital.

Department of Orthodontic Abstracts and Reviews

Edited by

Dr. Egon Neustadt and Dr. Joseph D. Eby, New York City

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. Egon Neustadt, 133 East Fifty-Eighth Street, New York City.

The Incisor Relationships in Man in Their Evolutional Aspect. By Yoshikiyo Koganei. Abstracted from "Die Bissformen des Menschen und ihre stammesgeschichtliche Bedeutung," Ztschr. f. Morphol. u. Anthropol. 34: 131, 1934.

The author is concerned with the establishment of racial differences and phylogenetic significance of incisor occlusion (or bite) in the dentition of man. He divides the normal forms of incisor bite relationship in man into two types: those with edge-to-edge (Zangenbiss) and those with overbite (Scherenbiss) relationship. The edge-to-edge bite is characteristic of the dentition in primitive man (Naturmenschen) and the overbite in civilized man (Kulturmenschen). The way in which such differences arose is attributed to phenomena of reduction. All reductions, he maintains, appear prevalent in civilized man, while reversions are especially noticeable in primitive man. In other words, the reductions of the dentition in the civilized races are farther advanced than in the primitive. The dentition of primitive man is nearer to the anthropomorphae in all particular features than to civilized man.

The particular point made in the reduction phenomena is the development of a malrelation between the upper and lower jaws. The most important features leading to this malrelation, in the estimation of the author, are the following:

1. The more frequent absence of the mandibular than the maxillary central incisor.

2. The more frequent absence of mandibular than the maxillary premolars.

3. The more frequent absence of the second premolars and at the same time the persistence of the deciduous second molar is almost limited to the mandible. (In the reviewer's estimation, this inference will hardly be supported by any experienced observer.)

4. The absence of M3 (third molar), in the opinion of the author, is more frequent in the mandible. (According to certain investigations of the reviewer, there is a reverse difference in males between the missing M3 in the upper and the lower jaws. In exact figures, the third molars are absent in 27.0 per cent of cases in the upper and 23.0 per cent in the lower. In the female 24.21 per cent are missing in the upper and 26.0 per cent in the lower. But when they are missing in pairs, the upper are twice as often affected as the lower in females and one and a quarter times as often in males. The ratio of the right pair missing as compared with left is three to one in females. In males there is no difference between right and left.)

5. The vestigial form of M3 is frequent in the upper and rare in the lower. The lower M3 disappears suddenly without intermediate steps.

6. There are no clear differences in the reduction phenomena, as shown by the diminution of cusp number in the tooth crown and fusion of the tooth root between the upper and lower M3s.

7. The atavistic increase in tooth roots appears considerably more in the triple division of the upper premolars than in the double division of the lower.

8. A fourth molar and supernumerary incisors are more frequent in the upper jaw.

9. Irregularities of the teeth are more frequent in the lower than in the upper.

The author holds that, due to the increased degree in reductions of the lower teeth, the lower dental arch is shortened and shifted posteriorly, bringing about the overbite (Scherenbiss) from the form of edge-to-edge bite (Zangenbiss). (The question is whether this is true. The primitive bite relation in the early forms, as pointed out by Gregory, is one in which the upper teeth overhang the lower. Moreover, in the course of individual development in man the edge-to-edge relation develops with age. Although both forms are to be found in all races and at all ages, the overbite is more frequent in early stages of development than later in life. This is repeated twice in life, in the deciduous and in the permanent dentitions. As each reaches maturity, the frequency of edge-to-edge becomes predominant over the overbite.)

The conclusion drawn by the author is that "The reduction of the dentition has gone a step forward in the civilized races, introducing a difference between the upper and lower jaws, wherein the lower has shortened more than the upper." If measured by the forms of occlusion of the entire dentition and not by the bite relationship of the incisors alone, it is very questionable whether a sweeping conclusion of this sort will find much support.

Milo Hellman.

Anatomy for Dental Students. By Six Teachers (W. Wright, T. Yeates, J. S. B. Stopford, S. E. Whitnall, Mary F. Lucas Keene), edited by E. P. Stibbe, Baltimore, 1934, William Wood & Co.

This book is intended to give the dental student a thorough knowledge of general anatomy, and it is also intended to serve as a reference book for the dentist.

The first part, the systematic anatomy, covers practically all the topics of a medical anatomy book but places special emphasis on those regions which are of immediate concern to the dentist. The bones of the skull, for instance, are described in 31 pages, while only one page is devoted to the bones of the limbs.

Besides the chapter on bones, the systematic part covers the joints (with special emphasis on the temporomandibular articulation); the muscles (mastication, deglutition, respiration); the circulatory system (arteries of head and neck, lymphatic system of head and neck); the central nervous system; and the abdominal viscera.

Two general chapters, one dealing with histology and the other with embryology, close the first part of the volume. Like the preceding chapters, they discuss only medical topics and not the specific dental structures.

The second part of the book gives, with the aid of numerous illustrations, detailed instructions for the dissection of the various regions.

E. N.

The Forum

Articles for this department should be sent to Dr. Albert H. Ketcham and Dr. William R. Humphrey, 1232 Republic Bldg., Denver, Colo.

Shortening Orthodontic Treatment by the Patient's Cooperation and Record

Two factors are essential to the satisfactory conclusion of orthodontic treatment. One is treatment by the orthodontist, and the other is cooperation by the patient. At first glance it would seem that the orthodontic treatment is more important than the patient's cooperation, but a little careful reflection will show that this is not the case.

Let us examine the facts. The patient is under the direct treatment of the orthodontist only about one hour in one or two weeks. What is the patient doing during the great many hours away from the orthodontist's office? If he is not cooperating with the orthodontist by following instructions, he can certainly go a long way toward ruining all the orthodontist's efforts.

I have found that many patients have themselves been the cause of prolonging their period of orthodontic treatment, simply because of their own lack of cooperation with the orthodontist. To state it clearly, I mean neglect in cooperating with the orthodontist in following his instructions, such as:

1. Keeping appointments.
2. Refraining from eating sticky foods, such as caramels, chewing gum, etc., which have a definite tendency toward distorting and displacing orthodontic appliances.
3. Refraining from fingering orthodontic appliances, thus causing their distortion or displacement.
4. Having all loose bands properly cemented, and having distorted and broken orthodontic appliances promptly repaired and adjusted.
5. Having the teeth properly cleaned and brushed and the gums massaged.
6. Regular periodic visits to the dentist for the care of the teeth is stressed.
7. Diligent use of rubber bands when and where indicated is emphasized.
8. Daily deep breathing exercises are recommended for the correction and prevention of harmful mouth habits, such as mouth-breathing, lip biting, etc.
9. Finally, having the patient keep a written record of his own home care, exercises and treatment is particularly recommended.

METHOD OF SECURING THE PATIENT'S RECORD

In order to facilitate keeping such a record, the patient is given a sample page which may be transferred to any small sized notebook. It consists of four vertical columns and enough transverse lines to provide for each day of the

week, as shown in Fig. 1. The first column is headed by Dt (date); the second column by R (rubber bands); the third column by C (cleaning teeth); and the fourth column by B (breathing exercise). The seven transverse lines under these letters provide for a seven-day or one week's record. The eighth line is for the average of the week. The illustration shows the year and the dates for four weeks from Sunday, February 3, to Sunday, March 3, 1935. Comparisons may be made with the averages of each of the four weeks of the various months to determine what progress if any has been made by the patient in the home care represented by R, C, B, meaning, respectively, use of rubber bands, cleaning teeth, and breathing exercises. The figures noted in the first week under R indicate the number of hours the rubber bands were used by the patient. The figures under C show the number of times the patient used the toothbrush to clean his teeth. The figures under B show the time in hours which the patient used for the deep breathing exercises.

After carefully studying the patient's record, definite recommendations of benefit to the patient may be made. For example, if the patient uses the intermaxillary rubber bands twenty-four hours daily and the teeth are seen to move

1935

	Dt	R	C	B	Dt	R	C	B	Dt	R	C	B	Dt	R	C	B
S	Feb 3	23	4	1	Feb 10				Feb 17				Feb 24			
M	4	20	3	1	11				18				25			
Tu	5	0	2	½	12				19				26			
W	6	4	2	¼	13				20				27			
Th	7	10	0	¼	14				21				28			
F	8	14	1	½	15				22				Mar 1			
Sa	9	0	1	½	16				23				2			
	1 AV WK	10½	1⅞	⅝	AV WK				AV WK				4 AV WK			

Fig. 1.

too rapidly, the time may be reduced to twelve hours daily more or less, as the case would indicate. It has been my custom to use as little pressure as possible to obtain the results required. Therefore the length of time the intermaxillary rubber bands should be worn may very often be reduced.

Deep breathing exercises and exercises of the muscles of the face and lips may also be increased or reduced, as the case indicates, after the patient's written record has been examined. The importance of encouraging the patient to keep his teeth clean by brushing them regularly cannot be overemphasized. Tooth decay and irritated gums frequently may thus be avoided. This is particularly important during orthodontic treatment. By having the patient keep a record of the number of times he uses the toothbrush, he is reminded of its importance. My patients are instructed to use dentifrice with the brush twice daily, morning and night. After each meal they are instructed to brush off every particle of food with a rubber bristled brush dipped in a good mouth wash or salt water, no dentifrice being used. The number of times the brush is used with or without dentifrice is recorded by the patient. Thus the orthodontist may more definitely determine how much or how little care the patient is giving to his teeth, and make the necessary recommendations.

By way of criticism of the patient's records, some may say that patients will not keep them, nor keep them honestly. It is my experience that they will endeavor to keep an honest record and will frankly confess negligence on their part in carrying out the home care recommended. The orthodontist will thus at least know where the trouble lies, and how to set out to correct it. Many instances of the benefits of the patient's records have been observed. I have in mind one case in particular of a pronounced distoclusion accompanied by protruding maxillary incisors associated with mouth-breathing. The patient was instructed to use the intermaxillary rubbers all the time. When asked, she invariably said that she used the rubbers as directed. After keeping a written record she frankly admitted that she used the intermaxillary rubbers about three hours daily instead of twenty-four. She cleaned her teeth very little and was a bit too lazy to do her deep breathing exercises. After talking to her seriously regarding the importance of R (use of the rubber bands), C (cleaning teeth), and B (breathing exercises) indicated in the diagram, she made an earnest attempt to follow instructions, with the result that a remarkable improvement took place in her condition.

This has been written with the hope that orthodontists will make a serious effort to secure the full cooperation of the patient and make use of the patient's own written record as here recommended.

Samuel Herder.

Orthodontic Education and the Dental School

Albert Edward Wiggam has said that man likes to call himself a reasoning animal because he reasons so little. It is certain that most of his reasoning is in retrospect. He acts first, then goes to great ends to develop a philosophy rationalizing his action. The teaching of orthodontics in the dental curriculum is a splendid example of Mr. Wiggam's observation. More attention has been directed toward the justification of past mistakes than to the development of a practical teaching program in the light of known conditions.

We shall progress more rapidly to an intelligent solution of our problem if we consider a few well-established facts and eliminate the many irrelevant issues which, either purposely or accidentally introduced, muddle our thinking. In the first place, the present teaching of orthodontics is not effective. In simple language, the dental student, graduated with the degree of Doctor of Dental Surgery and in possession of his state board certificate, is not a safe practitioner of orthodontia. Let us not cloud this issue with reasons why he cannot be expected to be, or that it was equally true fifteen years ago, or that the same condition exists in medicine, or any other sidetracks which have led us to think in circles on the matter.

The second pertinent fact is that unless the present dental curriculum is greatly expanded, there is not time enough in the dental course to furnish this training. Again with hold the interjection of comments relative to the increases in time and the improvement in content which have been made and those suggested, the discussion of type of instruction, etc. The fact remains that there is not the physical space in the two-three or the two-four year course to do it.

That this is due to the peculiar nature of both the fundamental and the clinical phases of orthodontics does not alter the cold reality of the condition.

A third unfortunate circumstance is that there are not at the present time enough sufficiently well-trained teachers to man the courses if the time were available for them. We are not concerned with the plaintive comments that men are doing their best, and that a little effort is better than none, and that this has always been good enough. The vital point is that a man cannot lift himself by his boot straps, and that if the modern concepts of orthodontic science are to be taught it must be by some one who understands them.

It is unnecessary to enumerate the evils which have arisen from the current method of teaching; suffice it to mention the short term courses which prosper, because of the hope they engender in the practitioner that he will be able to substitute a technic for basic training. I need not remind you of the imposing number of cases that are treated through the utilization and even the direction of the commercial dental laboratory, and point out the growing resentment of the laity as a result of the quality of service rendered. The dental profession has zealously resisted any suggestions of a separation of orthodontia from dentistry where it logically belongs as a specialty of that science. Yet it is difficult to understand this attitude when it has been accompanied with educational policies which have thwarted orthodontia's development and discredited its performance.

What may be done constructively? These difficulties are not insurmountable. The problem awaits a sober, intelligent, and dispassionate attack, without the confusion of emotional and unrelated controversy. Our concern need not be with a discussion about simple and difficult cases or limitation of the practice of specialists if we give attention to the vital principle, that the practitioner, specialist or no, be qualified to perform the services which he has been led to believe are within his capabilities.

The solution at present lies in giving the undergraduate an understanding of the normal denture, anatomically, physiologically, and developmentally; a knowledge of the factors and the mechanism active in the production of malocclusion; acquaintance with the principles of therapy; and an appreciation of the limitation of his knowledge. In this manner he will be able to be of material assistance in the prevention of malocclusion, cognizant of its existence, and familiar with the general nature of therapy. He will realize the need for more detailed study in the light of clinical experience and will have some basis for the training he requires before accepting the responsibilities of treatment. Further provision must be made in the graduate school for supplying this education, for the developing of teachers, and for additional contribution to our knowledge and understanding of the science.

Harold J. Noyes.

Which Man Are You?

Professional men of today may learn a great and valuable lesson from the following simple story. Two men go out into the woods on a spring morning—one sees nothing but the dark shadows upon the earth and the dry leaves which

fell last fall; the other man with his keen eyes and trained mind sees the green grass coming up, the new nests which the birds are building in the trees, the grandeur of the foliage, and the many minutely detailed wonders of Nature.

Every day we are called upon to look in the mouths of our patients, and too many of us are like the man who saw nothing but the large shadows and fallen leaves.

The man who is a success is the man who goes about his work with enthusiasm and a definite plan.

One of the most interesting and entertaining enterprises imaginable would be to go into the professional offices of the many men who are sitting around waiting for better times, and show this group the many *important* details which have been missed during their clinical examinations. The majority of patients are becoming more and more eager to learn the interesting story of dental health, and who is more qualified to give this valuable information than the dentist?

It is a well-known and well-established fact that we men in professional work are not so busy as we could be; so why is not this the finest reason in the world for us to take advantage of the wonderful opportunity of giving *every* patient *every* consideration? Casts are of great aid in studying occlusion, tooth and arch form. Photographic records, individual medical histories, full-mouth radiographic examination including bite-wing films, bacteriologic smears, vitality tests, and minute clinical examinations are relatively inexpensive items to the dentist; but if he proceeds with these fundamentals in a definite and planned manner, he certainly will be giving his patients a genuine health service. To you who answer that this takes time and few patients will pay for your services, do not forget that your own attitude and plan have a great deal to do with a patient's estimate of the value of your aid. Furthermore, we must not overlook the fact that tomorrow will some day surely come, and is it not logical to assume that those whom we do our best to aid will be surer to seek our advice some future day?

Too many of us are suffering from inertia, and are too eager to criticize modern competition and methods. Would it not be well to take an inventory of ourselves; to take advantage of our mental resources, professional aids, dental association advantages, and worthy plans for accomplishing real work?

When you examine the mouth of your next patient, will you be the man who sees only the shadows and fallen leaves; or will you, through definite planning and honest enthusiasm, be the man who has an interesting and instructive story to tell about the minutely detailed wonders of Nature?

If you were a patient, which man would you rather listen to—and which man would you want to see again?

Arthur B. Metzger.

The Dental Practice Act of Colorado

The Colorado legislature passed and the governor signed, on March 8, a dental practice act that will give Colorado one of the finest dental laws in the

United States. It embodies good features of recent legislation in other states and in addition gives the profession the power to establish rules of professional conduct.

Section 3 creates a rotating Board of Dental Examiners, each of whom must be selected from a list supplied by the Colorado State Dental Association.

Section 6. "The practice of dentistry in the State of Colorado is hereby declared to affect the public health and safety and to be subject to regulation and control by the State in the public interest. It is likewise declared to be a matter of public interest and concern that only qualified dentists be permitted to practice dentistry in Colorado. It is further declared to be a matter of public interest and concern that the dental profession, as a whole, merit and receive the confidence of the public. In the opinion of the General Assembly these policies will be best effectuated by vesting in the State Board of Dental Examiners the largest degree of discretionary power permitted by the Constitution of the United States and the Constitution of the State of Colorado. All laws relating to the practice of dentistry shall be construed in accordance with the declarations of policy contained in this paragraph."

Section 9 provides for the suspension of the practice of a dentist during a period of mental disability or an affliction with a disease which renders him a menace to his patients.

Section 11. Definitions of unprofessional conduct in this section correspond to those in recent statutes enacted in many states. The Colorado law grants the Board great discretionary power in order to thwart the attempts made by clever attorneys to circumvent an exact wording of law. It adds: "The foregoing specification of acts constituting unprofessional conduct shall not be construed as a complete definition of unprofessional conduct nor as authorizing or permitting the performance of other or similar acts not denounced, or as limiting or restricting the Board of Dental Examiners from holding that other or similar acts also constitute unprofessional conduct. Its only effect shall be to make clear that the acts and conduct mentioned do constitute unprofessional conduct and to restrict the Board of Dental Examiners from authorizing or attempting to authorize or permit such acts and conduct."

Section 12. "The professional or unprofessional character of any conduct depends upon the prevailing opinion of the profession within the area concerned toward that class of conduct and, in recognition of that principle, authority is hereby given to the licensed dentists of Colorado to adopt, amend, and repeal rules of professional conduct in the manner hereinafter provided. The State of Colorado as a whole is hereby declared to be the only unit of area concerned for determining standards of professional conduct for the practice of dentistry and the same standards shall prevail throughout the entire state. Neither the rules adopted by the licensed dentists of Colorado taken collectively nor in connection with the provisions of The Dental Practice Act shall be construed as a complete definition of unprofessional conduct nor shall the principle of *expressio unius exclusio alterius* be applied in the construction of such rules. Whenever a question of the professional or unprofessional character of any given conduct on the part of a licensed dentist comes before the Board of Dental Examiners

for decision, which conduct is not specifically denounced as unprofessional either by statute or by formulated rule, the members of the Board shall be regarded as experts on the subject and shall decide the same according to their judgment of the prevailing attitude of the profession within the state without requiring testimony concerning that attitude. Whenever the Board desires to have an expression of opinion from the licensed dentists of the state concerning their attitude toward conduct of a certain character, it may formulate a rule denouncing such conduct in general terms as unprofessional and shall submit such rule to the licensed dentists of the state preceded by the interrogatory: 'Shall the following be adopted as a rule of professional conduct for licensed dentists in the State of Colorado?' A copy of such rule and interrogatory shall be sent by mail to every licensed dentist in the State of Colorado, and it shall be the duty of every licensed dentist to respond thereto within sixty days of receiving the same. Said period of sixty days is allowed for discussion of the rule and organizing support of or opposition to the same. If a majority of the licensed dentists in the state vote in favor of the rule, the Board shall so notify every licentiate by mail and the rule shall be submitted in like manner and with like effect. Upon receipt of a petition signed by at least 50 per cent of the licensed dentists of Colorado asking for the adoption, amendment or repeal of any rule, the Board shall promptly submit the same to the licensed dentists of the state and announce the result in the manner and with the effect herein-above provided for rules originating with the Board."

This section is a departure from the usual procedure in law except that it is somewhat similar to the procedure of the Integrated Bar Association in some states. It is expected that a court will recognize the justice of a learned profession setting a standard of conduct for its members, and that should add weight and force when presented as the attitude of the whole dental profession in the state.

The expression "expressio unius exclusion alterius" is a law term meaning that because certain acts are mentioned all other acts not mentioned are excluded. Section 12 expressly states that this definition shall not apply to prevent the dental profession from specifying that other acts may be considered unprofessional. The North Carolina Supreme Court in a recent decision used the term in limiting the Dental Board to the exact wording of the law in that state.

Section 13 directs and strengthens the powers of the Board in conducting hearings. "The respondent shall be given a fair opportunity to present his case to the Board as he sees it, and he may be required by the Board to answer on oath any question that may be propounded to him and to produce records," etc. "Mere technicalities shall be disregarded and the Board shall not be bound by rules of evidence or rules of procedure applicable to courts of law. The findings and conclusions of fact made by the Board at such hearing shall be conclusive in all tribunals, but the action of the Board may be reviewed by the district court of the county in which the hearing was held by writ of certiorari and not otherwise for the sole purpose of determining whether the Board had jurisdiction and proceeded fairly in conducting the hearing, and whether any constitutional rights of the respondent were violated. *No order of the Board*

made at a hearing revoking or suspending a license shall be set aside or suspended or its enforcement enjoined except after a final hearing on a writ of certiorari. A license to practice dentistry shall not be regarded as a *property right* or *a vested right* but as conferring a special privilege to be exercised only so long as consistent with the public health, safety and welfare.''

Section 13 gives a respondent an opportunity to present his case in the district court to safeguard his constitutional rights but with restrictions that should prevent delays or setting aside enforcement of the acts of the Board.

OPINION IN OREGON, APRIL 1

April 1, in an opinion by Chief Justice Charles J. Hughes, the United States Supreme Court upheld the Oregon Dental Law prohibiting advertising. The opinion stated that advertising was objectionable because it tended to demoralize the profession and therefore was against the public interest. This is final and upholds the ethics of the dental profession in banning advertising.

I. C. Brownlie,
Chairman, Legislative Committee.

Arizona's New Dental Law

The biennial session of the Arizona legislature, meeting in January and February, amended the dental laws and deleted everything pertaining to orthodontia. This was with the consent and approval of the Arizona State Dental Society. After six years of separation of orthodontia and dentistry, during which one applicant was granted an examination and was licensed to practice orthodontia, the law now makes no mention of any speciality.

An attempt was made to amend the section pertaining to orthodontia, and some excellent changes were suggested by the legislative committee, but they were promptly dropped when brought before the state society meeting. The debated point that orthodontia should no more be separated from dentistry than should any other specialty was constantly in the minds of a group which succeeded in winning its point. An amendment suggested by the writer which might have been included in the new law, had a compromise been necessary, read as follows:

''A person wishing to specialize in any phase of dentistry, who limits his practice to said specialty or holds himself out to the public as a specialist, shall be required to take the general State Board, and in addition shall be required to spend one year in resident work in some recognized dental school offering a graduate course, or shall have been in exclusive practice of said specialty for five years before making his application. He shall then be further examined by two practicing members competent to examine him in his specialty.''

The new law carefuly describes who shall be deemed practicing dentistry and reads as follows under Section 3:

''A person shall be deemed to be practicing dentistry who, by himself or by an agent, employee, servant, or contractor, for fee, compensation, emolument,

or reward, direct or indirect, received or expected to be received by himself or another person, and, with specific reference and application to the teeth, gums, jaws, oral cavity, or tissues adjacent thereto, in living persons, shall do or propose, agree, or attempt to do, or make an examination or give an estimate of cost with intent to: (a) Perform an operation or administer an anesthetic in connection therewith; (b) diagnose or treat any condition, disease, or lesion; (c) take an impression; (d) correct a malposition; (e) treat a fracture; (f) remove calcareous deposits; (g) replace missing anatomy with an artificial substitute; (h) construct, make, alter, or repair an artificial substitute or restorative or corrective appliance; (i) do any other remedial, corrective, or restorative work."

Under Section 10, powers and duties of the Board, we read: "investigate charges of misconduct on the part of licensees, revoke licenses as the facts may warrant, and reinstate licenses in proper cases; collect and disburse monies, and perform all other duties and things necessary to carry out the purposes of this act which are not specifically or by necessary implication delegated to some other person or persons. The board may sue and be sued, and shall have the power to compel the attendance of witnesses, administer oaths, and take testimony concerning all matters coming within its jurisdiction. If any person refuses to obey a subpoena issued by the board, such refusal shall be certified to the superior court of Maricopa County and proceedings instituted for contempt of court."

"Section 17. Annual registration; forfeiture of license; reinstatement. On or before January 1 of each year every licensed dentist shall pay an annual registration fee of not to exceed five dollars. Said fee shall be five dollars for the year 1936, and for each succeeding year until changed by order of the board. Failure to pay said annual registration fee shall ipso facto work a forfeiture of license, but upon written application and payment within the calendar year of such forfeiture, of a fine of ten dollars, or if after such year, of a fine equal to the examination fee current at the time of application, the board shall, without examination, reinstate said license. Whenever issued, such reinstatement shall be as of the date of application, and shall entitle the applicant to an annual registration receipt only for such calendar year."

Section 19. Examinations; papers open to inspection. ". . . All examination papers shall be kept by the secretary and open to inspection at reasonable times by members of the board, by the applicant or an authorized agent, or by a court of competent jurisdiction in a proceeding in which the question of the contents of such papers is properly involved, for a period of ninety days from the date on which the examinations are begun, and may then be destroyed. Such examination papers shall be deemed to be the property of the board and shall not be removed from its possession without its consent."

Section 22. Dentistry to be practiced only under name of licensee; name and license to be displayed; duplicate licenses. "It shall be unlawful to practice dentistry under the name of a corporation. The name of every person practicing dentistry shall be conspicuously displayed at the entrance to the place where he practices. His annual registration receipt for the current calendar year shall be displayed in his place of practice in such manner as to be readily observable at any time by patients or by visitors. . . ."

Section 25. Penalties for misdemeanor. "A person convicted of a misdemeanor under this act shall be punished by a fine of not less than one hundred dollars nor more than five hundred dollars, or by imprisonment in the county jail for not less than one month nor more than six months, or by both such fine and imprisonment, and upon conviction of a subsequent misdemeanor under this act by a fine of not less than five hundred dollars nor more than one thousand dollars, or by imprisonment in the county jail for not less than six months nor more than one year, or by both such fine and imprisonment. All such violations shall be prosecuted by the county attorney and tried before the superior court of the county in which the violation occurs."

It is the consensus of opinion that Arizona now has a dental law which is as near perfection as the state can hope to have for some years to come. The legislative committee spent three years in compiling the law, carefully examining the good points in laws of other states as well as looking up decisions by higher courts on questionable points. The original draft included a clause relating to the size of type used in newspaper advertising, but it was dropped when at a hearing the National Publishers' Association threatened to block passage of the bill unless this was stricken out. The most that could be accomplished to prevent advertising is in the latter part of Section 20 which reads as follows: ". . . or of employing or making use of solicitors or publicity press agents; or of the making, circulation, or publication of misleading, fraudulent, or false statements concerning his knowledge, skill, art, or methods of treatment or practice tending to deceive or mislead the public, it shall revoke said license."

To sum up, the new law now does not contain the word "orthodontia," nor is reference made to it. The law now permits the board to revoke a license. The law is greatly strengthened by requiring annual registration.

The law is more strict relating to advertising. It now has the necessary teeth to go after and convict illegal practitioners.

Percy Norman Williams.

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Editorials

Dental Education by Radio

SCIENCE, whether it be dental science or any other department of science, is highly respected by every one. Real science, however, is one thing, and modern sales talk, or phoney science, is another thing; and the problem is not unlike that of attempting to detect the spurious diamond from the genuine. Real science is often clowned by its impostor. Advertisers of some dental products of nationwide distribution have lost the support of the majority of the members of the dental profession by parading science hokum in regard to dental products before the layman in magazines and in radio talks. It was, therefore, somewhat extraordinary to listen to a broadcast which was different, by Edwin C. Hill, radio commentator, on the evening of February 7, on the Forum of Liberty program, in which he paid tribute to dentistry.

Mr. Hill won for himself the respect of the profession when he clearly gave credit and honor where credit and honor are due. Members of the dental profession who listened to the talk were struck by the fact that there was broadcast to the layman much information on the subject of dentistry which dentists themselves have known a long time but have little appreciated.

Radio publicity is now a powerful control over public thought. This powerful but new publicity medium is effective and formidable, and is destined to exercise great influence over public thinking in the future.

Because it is rare for dentistry (or any other profession, for that matter) to be portrayed in such an intelligent and capable manner by commentators and writers, also because it is unusual for a layman to display such a wide acquaintance with the traditions and background of dentistry, excerpts from Mr. Hill's remarks will be of interest to the dental profession.

"Dentistry is a highly specialized and well-developed department of medicine and very definitely assumes its important responsibilities in general health service. In the new social health service and health insurance about which so much is being said and about which so much is being written at the present time in conjunction with the New Deal's socialistic moves, dentistry takes a highly important position in health service and will move right along in unison, and hand in hand with medicine.

"Dentistry, while entirely modern in its scientific development and in its general relation to health service, notwithstanding, tooth and jaw injuries are known to be numbered among man's earliest afflictions."

Particularly interesting to the laity was Mr. Hill's description of the discovery of ether anesthesia by a dentist. In referring to that important finding he commented that the first college of dental surgery was founded in Baltimore and that only six years later occurred the most spectacular and amazing discovery ever credited to either medicine or dentistry.

"This happened in the operating room of the Massachusetts General Hospital almost ninety years ago—the physicians in charge of the patient upon whom the proposed operation was to be performed and the anesthesia was to be given, were skeptical, of course. They more or less believed the discovery of anesthesia by this dentist to be a humbug. Dr. Warren, the surgeon in charge, announced: 'The anesthetic was to be administered by Dr. Morton, a dentist of this city, who claims to have successfully operated on his own patients with the use of sulphuric ether. At his request, and with the consent of the patient here, I offered to cooperate with him in the use of his new discovery in a major operation.'

"Later Dr. Morton did arrive and gave the anesthetic, and the surgeons announced, 'My God, man, you have accomplished a miracle. The highest mercy ever brought by man to man.' That was the discovery of general anesthesia, and credit goes to Dr. Morton, who was a dentist. Dentists naturally look upon this incident with pride. No other discovery probably proved such a boon to humanity or struck from the lives of people such misery and pain. It marked an epoch in the history of the healing art. Not only this but it seems to have left a line of demarcation for the foundation of dentistry as a distinct and important branch of medical science which is necessary to health. In the years which

followed a number of dental schools were founded, even the great Harvard University announced the establishment of its dental school. Accordingly, it was only a short time until dentists were transformed from an unorganized craft doing their work more or less mechanically into a firmly amalgamated profession, sixty thousand strong, with fifty-one schools, professional associations, and a literature all of their own."

Mr. Hill then told something about dentistry that most Americans do not know: "America is and always has been the acknowledged leader of the world in the field of dentistry. Her schools educate many students from foreign countries. She is a recognized pioneer of new discoveries and new technic; her people are much more dentistry conscious than are people of other countries. People know that clean, healthy, sparkling teeth are necessary to perfect health, and dentistry is still going forward scientifically by leaps and bounds."

During these times of stress and uncertainty for the future of dentistry, as well as that of medicine, professional journals are saturated with new ideas and suggestions pertaining to "socialized medicine." The subject is being more and more openly discussed in lay magazines. In these periodicals, however, writers usually manifest an approach somewhat apart from the usual dental approach. They convey the impression first that there really are many things wrong with the old order of private practice of both medicine and dentistry. They suggest that old precedents are outworn, that they are threadbare from use and are not in step with the present pattern of society which is being designed for the people. They point out that there are thousands of unemployed physicians and dentists, that at the same time there are people distressingly in need of health service; accordingly it is usually suggested that something is wrong and that a remedy for such a condition must be found promptly.

There never before has been a time when the right kind of lay publicity for the professions was as important as it is now. The type of publicity given dentistry in Mr. Hill's broadcast is invaluable to the advance of the profession, and it should receive the enthusiastic cooperation of the entire dental profession. This type of publicity builds prestige for the profession. Whether this publicity is paid for by organized dentistry or whether it originates from commercial sources is not so important as is the kind and type of publicity; particularly since dentistry (an important health service) so urgently needs dental health propaganda. Socialized dentistry is beginning to take root, and in the final analysis the dental status will reflect nothing more or less than a cross-section of the layman's appraisal of the importance of the dental profession. Society's concept of the relation of dentistry to the health of the people will ultimately fix dentistry in its proper place in social health service.

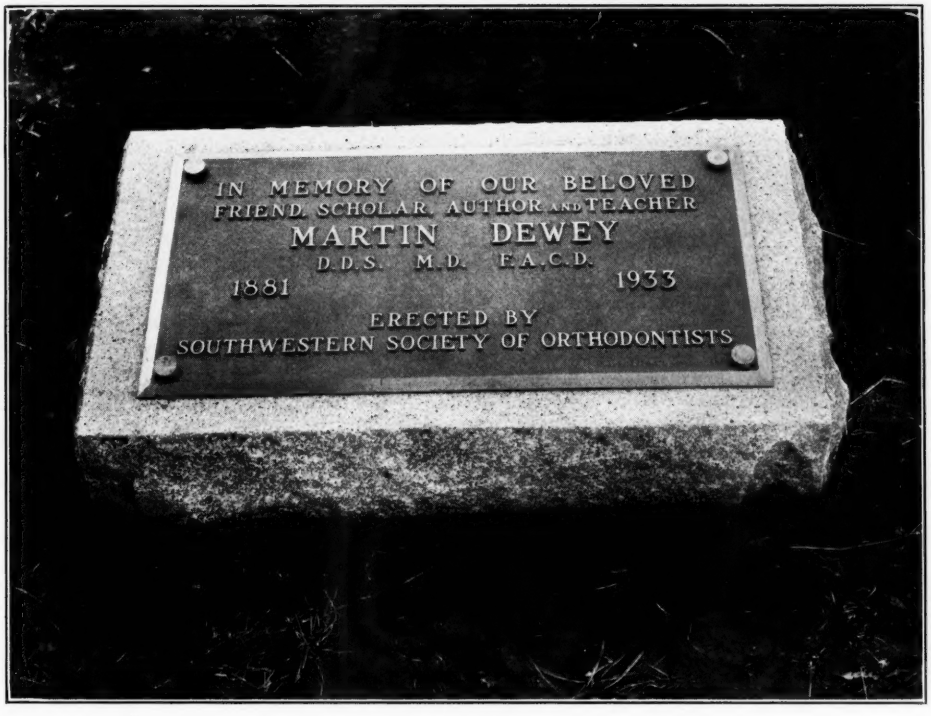
Mr. Hill's radio talk was interesting even to dentists because he showed that there is tradition, color, drama, romance and even glorified honor in their work, which they possibly sometimes overlook. Such comment is refreshing and wholesome when contrasted to the usual scientific build-up; it is appetizing in contrast to the usual garrulous bunk, sailing under the false cloak of science.

National advertisers understand the psychologic phenomenon applicable to advertising in relation to science. They know that the dividing line between science and hooey is often rather carelessly drawn and is difficult for the average

mind to identify. Psychologists have long known that the lay mind, from an advertising point of view, is sophomoric in its response and that not one individual in twenty-five discerns the difference between science and its parasite, scientific hokum, when skillfully disguised under the name of science. A photograph of a long white coat, a pair of eyeglasses, a test tube half filled with some obviously mystic solution—this serves as a stage setting for almost any kind of scientific swashbuckling that is to be paraded before the public eye. The majority like it and believe it, others scoff; but the scoffers are in the minority and, therefore, unimportant.

Dentistry is changing for the better. It is attracting wide attention as a health service, and is going through this kaleidoscopic change it is cutting some of its eye teeth. Figuratively speaking, its funny bone is being tickled by the racket of modern scientific propaganda; its really scientific attainments are in too many instances being exploited as comic sheet or Sunday supplement copy. This new racket, however, in all probability is only another sign of the times and no doubt will soon spend its momentum. An educational talk like that broadcast by Mr. Hill is of more service to dentistry and provides more dental education for the public than do all the scientific piffle and all the phoney test tube build-up that advertising agencies may create in years to come, because it is true, therefore important. Science is one thing; scientific "build-up" is another.

H. C. P.



A MEMORIAL TO MARTIN DEWEY

SOUTHWESTERN SOCIETY OF ORTHODONTISTS

THE Southwestern Society of Orthodontists, being very mindful of the aid rendered the Society by the late Martin Dewey, and desiring to show in some measure its appreciation, love, and esteem, presented a bronze tablet to be placed upon the headstone of his grave. The tablet was formally presented at the last annual meeting of the Society, at Abilene, Texas, October 15, 16, and 17, 1934. The dedication ceremony was held at Wichita, Kansas, December 23, 1934.

News and Notes

European Orthodontic Society

The European Orthodontic Society will hold its meeting at the Langham Hotel, London, W. 1, on July 29 and 30, 1935, with Dr. Sheldon Friel as its President. Many eminent European orthodontists have signified their intention of being present and reading papers or giving clinics and demonstrations. They look forward to a very interesting meeting, as there is a marked and growing desire to acquire knowledge of this fascinating subject.

The meeting will be immediately followed by the annual meeting of the American Dental Society of Europe, and it is expected the attendance will be a large one. Doubtless, when the final arrangements are made, there will be an exchange of hospitalities between the two societies, which was the arrangement of the last meeting at Scheveningen, The Hague, in May, 1934.

The European Orthodontic Society, by invitation from the Secretary, Mr. G. F. Cale-Matthews, is very eager that co-patriots of America attend this meeting and contribute to the program.

The officers of the European Orthodontic Society at the present time are as follows: President, E. Sheldon Friel, Dublin; Vice President, H. E. March, Bexhill, England; Secretary, G. F. Cale-Matthews, London; Editor and Treasurer, O. Henry, London. Board of Censors: J. T. Quintero, Lyon; F. Stuhl, Paris; E. D. Barrows, London.

American Dental Assistants Association

The eleventh annual meeting of the American Dental Assistants Association will be held in New Orleans, Nov. 4-8. For further information address

LUCILE S. HODGE, General Secretary,
401 Medical Arts Building,
Knoxville, Tenn.

Missouri State Dental Association

The Missouri State Dental Association meeting will be held May 26, 27, and 28 in Jefferson City, Mo.

J. H. WILLIAMS, Publicity Committee,
Beaumont Medical Bldg.,
St. Louis, Mo.

Southern Society of Orthodontists

The fourteenth annual meeting of the Southern Society of Orthodontists will be held at the Signal Mountain Hotel, Chattanooga, Tenn., on September 30, October 1 and 2.

Members of the dental and medical professions are cordially invited.

WINSTON P. CAINE, President,
Medical Arts Building,
Chattanooga, Tenn.

WILLIAM P. WOOD, JR., Secretary,
442 W. Lafayette Street,
Tampa, Florida.

Dental Society of the State of New York

The Society will hold its Sixty-Seventh Annual Meeting June 12-15, 1935, at Saranac Inn, Upper Saranac, N. Y.

A cordial invitation is extended to all ethical dentists to attend the sessions.

DR. AUGUSTAVE NEUBER, President
619 Union Street,
Schenectady, N. Y.

DR. A. P. BURKHART, Secretary
57 E. Genesee Street,
Auburn, N. Y.

Fourth Belgian National Dental Congress

The Fourth Belgian National Dental Congress will be held at the George Eastman Dental Institute in Brussels from August 1 to 4.

For information write to Mr. A. Joachim, President of the Congress, 3 Rue de Hornes, Brussels; or to Mr. L. Demoulin, General Secretary of the Congress, 15 Avenue Fonsny, Brussels, Belgium.

International Dental Federation

The 29th session of the F. D. I. will be held August 4 to 10, in Brussels in the George Eastman Dental Institute, immediately following the Fourth Belgian National Dental Congress. This will be the last session before the International Congress in Vienna.

For information write to the General Secretary of the F. D. I., Mr. Ch. F. L. Nord, 1 Scheveningscheweg, The Hague.

International Congress at Vienna in 1936

The Quinquennial International Congress of 1936 will be held August 2 to 8, in Vienna, Austria. It has been planned that communications will be read in the mornings and demonstrations will be given in the afternoons.

GEORGE VILLAIN, President
Paris.

CH. F. L. NORD, Secretary
The Hague.

Notes of Interest

Dr. D. S. Sterrett announces the removal of his office to 549 West Eighth Street, Erie, Pa. Practice limited to orthodontia.

Dr. Ralph W. Eaton announces the removal of his office to 16 North Goodman Street, Rochester, N. Y. Practice limited to orthodontia.

Dr. Harry Allshouse, Jr., has recently removed his office to his new building, 6333 Wyandotte Street, Kansas City, Mo. Dr. Allshouse has built a new office, adapted and specialized for the practice of orthodontia exclusively.

Dr. Herman Weinstein announces the removal of his office to 535 Fifth Avenue, New York, N. Y. Practice limited to orthodontia exclusively.